



# HARDI ISO NOZZLES



Nozzle product guide

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# HARDI nozzle supremacy

## Precise, dependable and accountable

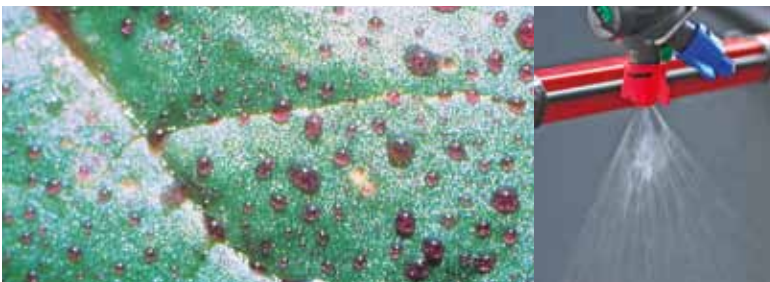
HARDI has produced sprayers since 1957 - meeting the needs of all farmers and crops worldwide - a key goal that has demanded the world's best nozzles.

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 crop protection 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 fall-out



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'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 relate to broad issues of drift such as airborne losses, downwind fall-out and deposits on non-target surfaces within the treated area itself. All of these issues need to be carefully considered.

HARDI is world leading 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 - Taastrup



# Nozzle technology

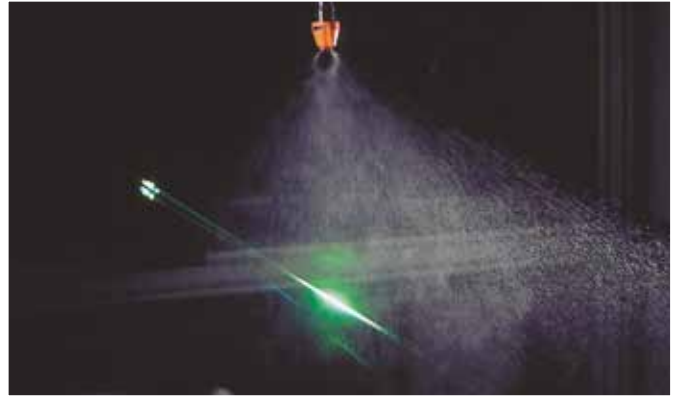
Fundamental research with nozzles by “HARDI agro-scientists” is conducted in their own dedicated laboratories and those of independent Research Centers at many key institutions throughout the world. Sites where field research is conducted are very diverse - ranging from the temperate conditions of Northern 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 programs, guarantees that HARDI nozzles will meet the demands of better crop protection.

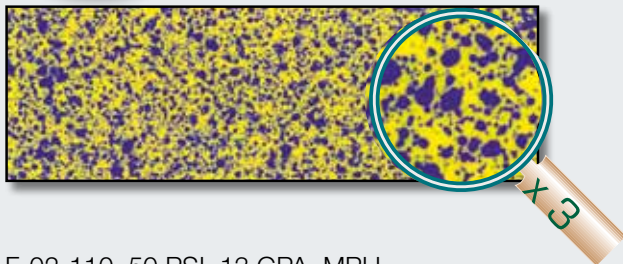
## Measuring droplet sizes

The droplet spectrum is characterized by the average



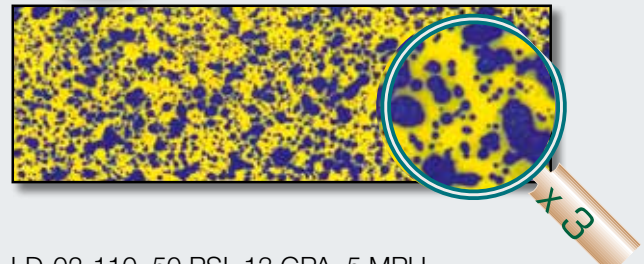
droplet size based on volume (VMD) and the range that indicates the uniformity of the atomization. A laser Phase Doppler Particle Analyser (Aerometrics, PDPA) supplies this information instantaneously and is used to constantly monitor the spray quality of our nozzles in our laboratory.

### HARDI Flat fan nozzles



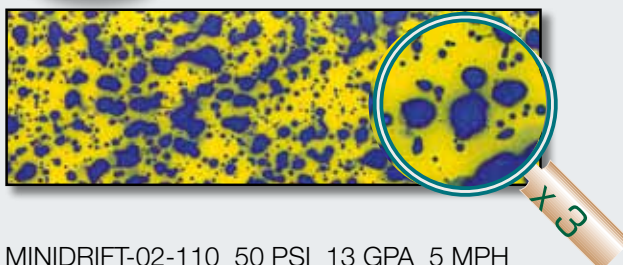
F-02-110 50 PSI 13 GPA MPH

### HARDI LD LowDrift nozzles



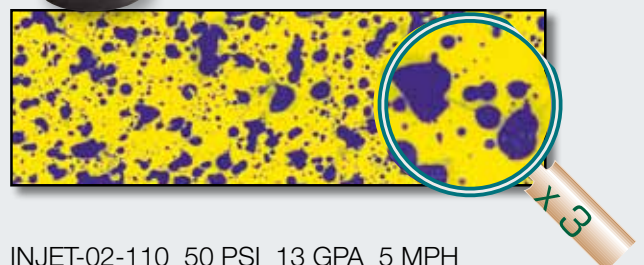
LD-02-110 50 PSI 13 GPA 5 MPH

### HARDI MINIDRIFT nozzles



MINIDRIFT-02-110 50 PSI 13 GPA 5 MPH

### HARDI INJET nozzles

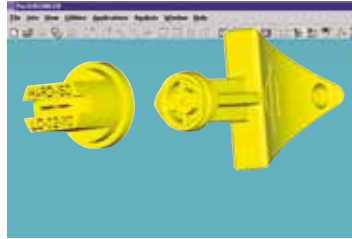


INJET-02-110 50 PSI 13 GPA 5 MPH

# 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 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.



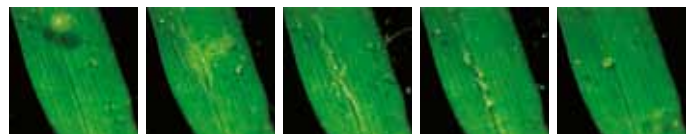
## Wind Tunnel Studies

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.

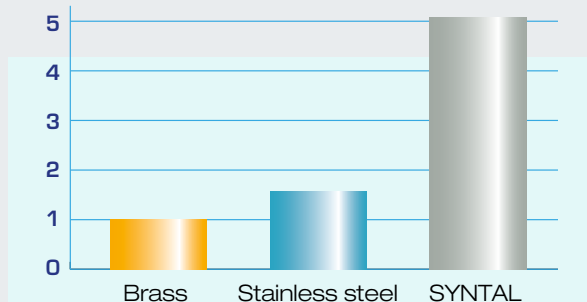
## High Speed Video

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



## 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.



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

(Kim Sintorn, Swedish University).

## Deposit tests

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

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

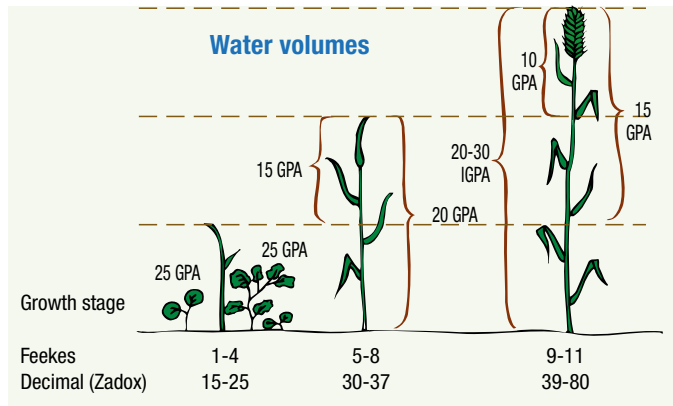


## Choosing nozzles

### 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 used when spraying lower water volumes. MINIDRIFT and INJET nozzles mix air with the spray liquid to coarsen the atomization. Drift is substantially reduced with these nozzles so that field delays due to high wind speeds are minimized 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.

### Water volume rate has a big influence

Your working capacity will largely depend on the water volume rate. Why? Low volume rates mean that less filling time and transport are required. In fact a volume rate reduction of 25% increases your capacity by more than 10%. A big difference even in the short term! You do, however, need to pick the right nozzle and speed for the job. Lower spray pressure alone will mean that both coverage and deposit are reduced. Note that the application rate of a nozzle should be approximately +/-40% of the medium flow at 47 PSI.

Classification category	Symbol	Colour code	Approximate VMD
Very fine	VF		<140
Fine	F		140-210
Medium	M		210-320
Coarse	C		320-380
Very coarse	VC		380-460
Extremely coarse	XC		460-620
Ultra coarse	UC		>620

### What about droplet size?

Droplet size is important, and your need will differ according to conditions and type of crop. HARDI nozzles follow BCPC/ASAE specifications with regard to droplet size classification. There are 7 size classifications but for most types of farming only “fine”, “medium”, “coarse” and “very coarse” are relevant. The challenge is that no nozzle will give you all spraying options and that is why you sometimes have to compromise.

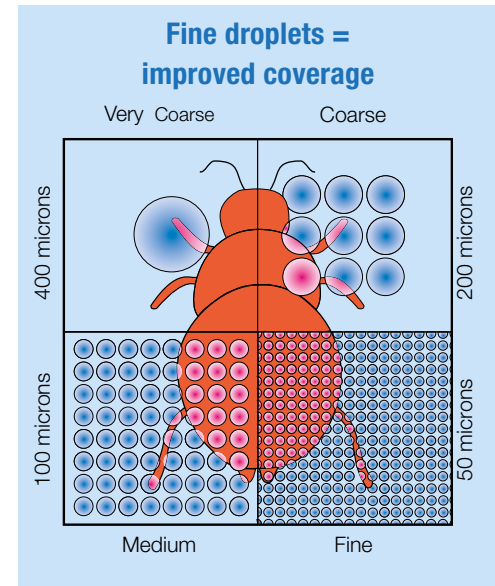
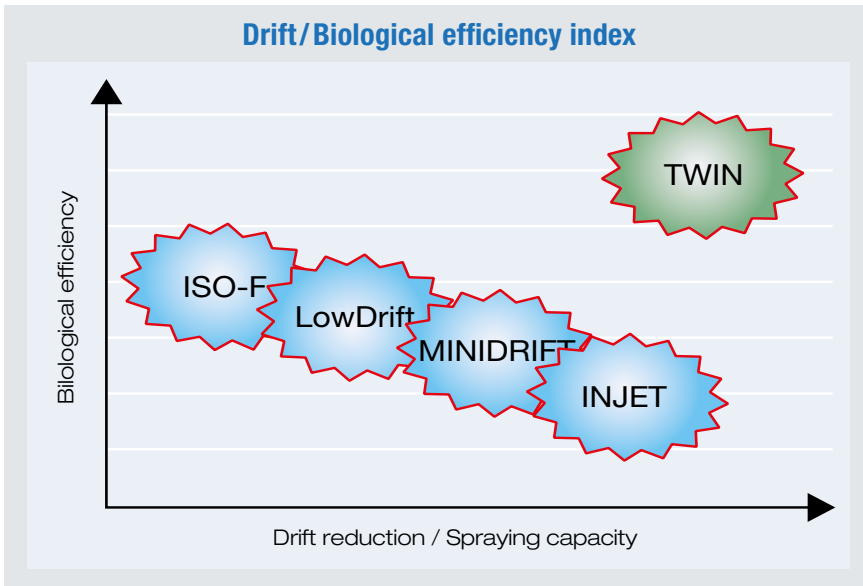
025-Lilac	20	0.177	M	10.5	8.8	7.5	6.6	5.8	5.3	4.8	4.4
	30	0.217	M	12.9	10.7	9.2	8.0	7.1	6.4	5.8	5.4
	40	0.250	M	14.9	12.4	10.6	9.3	8.3	7.4	6.8	6.2
	50	0.280	M	16.6	13.8	11.9	10.4	9.2	8.3	7.5	6.9
	60	0.306	F	18.2	15.2	13.0	11.4	10.1	9.1	8.3	7.6
	70	0.331	F	19.6	16.4	14.0	12.3	10.9	9.8	8.9	8.2
		SYNTAL-CT 371950 (12 pcs. 750626)					SYNTAL-S 371946 (12 pcs. 750628)				

The VMD data is belonging to the measuring equipment that was used. So the VMD data is only an estimate. The borders between the different categories are defined by a certain nozzle which is standardized in the ISO 25358. HARDI will only give the categories as the VMD as a single measurement is not useful for farmers as a decision tool. On the nozzle flow tables in this product guide is a separate column to indicate the spray quality.

### Make sure you have drift reduction nozzles

The new directives from around the world are stating that a sprayer must be equipped with drift reduction nozzles. So if you have not already considered a MINIDRIFT nozzle, maybe now is the time. Standard equipment on a sprayer will soon be required anyway. Drift reduction nozzles work with very coarse droplets; this is the only way to reach a high drift reduction level.

# Choosing nozzles



## 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 minimize wind drift and maintain even liquid distribution, spraying pressure between 20 to 70 PSI is recommended (INJET: 40 to 120 PSI). 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 for a good coverage.
- Small dicot weeds need good coverage either through fine droplets or – if using a coarser spray – by compensating with a higher volume rate.

- Contact action mode needs finer droplets.
- Use medium sized droplets for chemicals that are transported in the plants
- For large dicot weeds – coarse atomization 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 15 GPA and for TWIN not less than 8.5-10.5 GPA for optimum efficacy at lower chemical doses.
- When mixing products or using products with more than one mode of action, adjust to the most demanding component of that product mix.

**HARDI® ISO F-110**  
Standard flat fan nozzles

ISO size/color	PSI 20	30	40	50	60	70
0075-Pink	0.053	0.065	0.075	0.084	0.092	0.099
01-Orange	0.071	0.087	0.100	0.112	0.122	0.132
015-Green	0.106	0.130	0.150	0.168	0.184	0.198
02-Yellow	0.141	0.173	0.200	0.224	0.245	0.265
025-Lilac	0.177	0.217	0.250	0.280	0.306	0.331
03-Blue	0.212	0.260	0.300	0.335	0.367	0.397
04-Red	0.283	0.346	0.400	0.447	0.490	0.529
05-Brown	0.354	0.433	0.500	0.559	0.612	0.661
06-Grey	0.424	0.520	0.600	0.671	0.735	0.794
08-White	0.566	0.693	0.800	0.894	0.980	1.058
10-Light blue	0.707	0.866	1.000	1.118	1.225	1.323

**HARDI® ISO LD-110**  
LowDrift nozzles

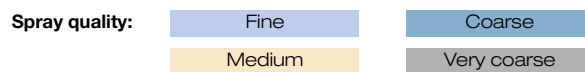
ISO size/color	PSI 20	30	40	50	60	70
01-Orange	0.071	0.087	0.100	0.112	0.122	0.132
015-Green	0.106	0.130	0.150	0.168	0.184	0.198
02-Yellow	0.141	0.173	0.200	0.224	0.245	0.265
025-Lilac	0.177	0.217	0.250	0.280	0.306	0.331
03-Blue	0.212	0.260	0.300	0.335	0.367	0.397
04-Red	0.283	0.346	0.400	0.447	0.490	0.529
05-Brown	0.354	0.433	0.500	0.559	0.612	0.661

**HARDI® ISO MINIDRIFT**  
Air inclusion nozzles

ISO size/color	PSI 20	30	40	50	60	70
015-Green	0.106	0.130	0.150	0.168	0.184	0.198
02-Yellow	0.141	0.173	0.200	0.224	0.245	0.265
025-Lilac	0.177	0.217	0.250	0.280	0.306	0.331
03-Blue	0.212	0.260	0.300	0.335	0.367	0.397
04-Red	0.283	0.346	0.400	0.447	0.490	0.529
05-Brown	0.354	0.433	0.500	0.559	0.612	0.661

**HARDI® ISO INJET**  
Air inclusion nozzles

ISO size/color	PSI 40	60	70	80	100	120
01-Orange	0.100	0.122	0.132	0.141	0.158	0.173
015-Green	0.150	0.184	0.198	0.212	0.237	0.260
02-Yellow	0.200	0.245	0.265	0.283	0.316	0.346
025-Lilac	0.250	0.306	0.331	0.354	0.395	0.433
03-Blue	0.300	0.367	0.397	0.424	0.474	0.520
04-Red	0.400	0.490	0.529	0.566	0.632	0.693
05-Brown	0.500	0.612	0.661	0.707	0.791	0.866
06-Grey	0.600	0.735	0.794	0.849	0.949	1.039
08-White	0.800	0.980	1.058	1.131	1.265	1.386



# Choosing nozzles

## Conventional sprayers

Spray quality	Normal spraying conditions - forward speed 3.5-5 MPH						Normal spraying conditions - forward speed 5-6.25 MPH						Windy, but cannot postpone - forward speed 3-3.5 MPH					
	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	
<b>Herbicides</b> - soil applied		10-20 GPA	20 GPA	10-20 GPA	10-20 GPA	10-20 GPA					15-20 GPA	10-20 GPA				18-20 GA	10-20 GPA	
- grass weeds		15-20 GPA		15-20 GPA														
- broadleaf weeds up to .75" across		15-20 GPA		15-20 GPA					20-25 GPA		18-25 GPA					18-25 GPA		
- broadleaf weeds more than .75" across		15-20 GPA		15-20 GPA					20-25 GPA		15-25 GPA	20-25 GPA				18-20 GA	20-25 GPA	
- Glyphosate		10-15 GPA		10-15 GPA							15-20 GPA	15-20 GPA				18-20 GA	15-20 GPA	
<b>Fungicides</b> - contact		15-30 GPA		15-30 GPA														
- systemic		15-30 PA		15-30 PA					20-30 GPA		18-25 GPA					18-30 GPA		
<b>Insecticides</b> - contact		15-25 GPA		15-25 GPA														
- systemic		10-20 GPA		10-20 GPA					20-25 GPA		18-25 GPA					18-25 GPA		



## TWIN air assisted sprayers

Spray quality	Normal spraying conditions - forward speed 5-6 MPH						Normal spraying conditions - forward speed 7.5-9 MPH						Windy spraying conditions - forward speed 6.5-7.5 MPH					
	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	
<b>Herbicides</b> - soil applied		10-20 GPA	20 GPA	10-15 GPA	10-20 GPA			10-15 GPA	10-25 GPA		10-20 GPA	10-20 GPA		15-20 GPA		10-20 GPA		
- grass weeds	10-15 GPA	10-20 GPA		15-20 GPA				15-20 GPA		15-20 GPA					15-20 GPA			
- broadleaf weeds up to .75" across	8-15 GPA	10-20 GPA		15-20 GPA				15-20 GPA		15-20 GPA					15-20 GPA			
- broadleaf weeds more than .75" across	8-15 GPA	10-20 GPA		15-20 GPA				15-20 GPA		15-25 GPA				18-25 GPA	15-20 GPA	15-20 GPA	20-25 GPA	
- Glyphosate	8-12 GPA	10-15 GPA		10-15 GPA				10-15 GPA		10-15 GPA	15-20 GPA			10-15 GPA	15-20 GPA	15-20 GPA	15-20 GPA	
<b>Fungicides</b> - contact	10-20 GPA	10-20 GPA		15-20 GPA				15-20 GPA		15-20 GPA					15-20 GPA			
- systemic	8-12 GPA	10-20 GPA		15-20 GPA				15-20 GPA		15-20 GPA					15-20 GPA			
<b>Insecticides</b> - contact	10-20 GPA	10-20 GPA		15-20 GPA				15-20 GPA		15-20 GPA					15-20 GPA			
- systemic	8-20 GPA	10-20 GPA		10-20 GPA				10-20 GPA		10-20 GPA					10-20 GPA			

Best choice

Useful alternative

Under optimum spraying conditions when fine atomization can be used with no drift hazard

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

Spray quality:

Fine	Coarse
Medium	Very coarse



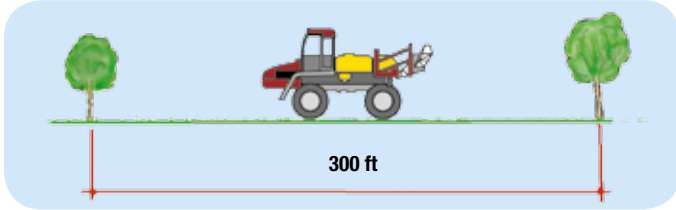


# Calibration of field crop sprayers

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 300 ft – note time to drive the distance.

### Example

If it takes 24 seconds to drive 300 feet, the spraying speed is 8.5

If it takes 24 seconds to drive 300 ft then the spraying speed is 8.5 MPH.

$$\frac{\text{distance driven (ft)} \times 0.68}{\text{time (sec.)}} = \text{MPH}$$

## 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. 285721).

### Example

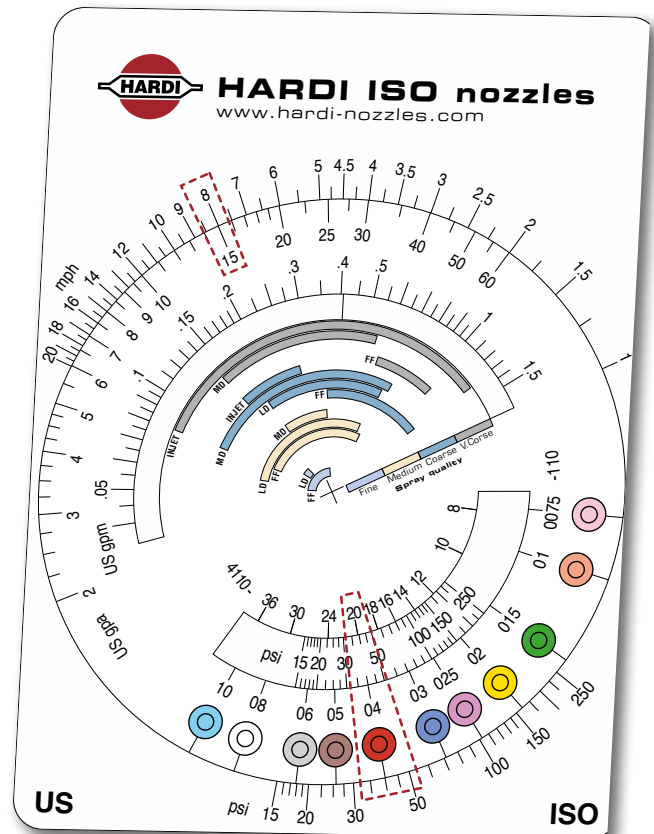
Volume rate 15 GPA

Pressure 40 PSI

Driving speed 8 MPH

Nozzle flow 0.40 GPM

Nozzle ISO F-04-110



## Calibration formulas

When calibrating, it is the perfect time to check the spray distribution 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.

### Speed check

$$\frac{\text{distance (ft.)} \times 0.68}{\text{Time (s)}} = \text{MPH}$$

### Nozzle output

$$\frac{\text{nozzle spacing (in.)} \times \text{GPA} \times \text{MPH}}{5940} = \text{GPM (per nozzle)}$$

### Pressure adjustment

$$\left( \frac{\text{new output (GPA)}}{\text{known output (GPA)}} \right)^2 \times \text{known pressure (PSI)} = \text{new pressure (PSI)}$$

### Application volume

$$\frac{5940 \times \text{GPM (per nozzle)}}{\text{nozzle spacing (in.)} \times \text{MPH}} = \text{GPA}$$



## Calibration of field crop sprayers

### 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 (81624503).



### 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 0.5 GPM at 40 PSI. If the density of the liquid fertilizer is 10.65 lbs/gal 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 45 PSI. The value can be found in the table at 40 PSI (calibrated pressure) and a density of 10.65 lbs/gal.

PSI	Density (lbs/gal)				
	9.00	10.00	10.65	11.00	12.00
	Adjusted pressure (PSI)				
20	21	22	23	23	24
30	31	33	34	35	36
40	42	44	45	46	48
50	52	55	57	58	60
60	62	66	68	69	72

### 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, 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.

1" x 3"  
50 pcs. no: 893211



### 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 [GPM] selected from this table, can then be used together with the nozzle tables on the following pages, to identify a suitable nozzle.

MPH	GPA															
	3	5	7	10	15	20	25	30	35	40	45	50	55	60	65	70
2				0.067	0.101	0.135	0.168	0.202	0.236	0.269	0.303	0.337	0.370	0.404	0.438	0.471
4		0.067	0.094	0.135	0.202	0.269	0.337	0.404	0.471	0.539	0.606	0.673	0.741	0.808	0.875	0.943
5	0.051	0.084	0.118	0.168	0.253	0.337	0.421	0.505	0.589	0.673	0.758	0.842	0.926	1.010	1.094	1.178
6	0.061	0.101	0.141	0.202	0.303	0.404	0.505	0.606	0.707	0.808	0.909	1.010	1.111	1.212	1.313	1.414
7	0.071	0.118	0.165	0.236	0.354	0.471	0.589	0.707	0.825	0.943	1.061	1.178	1.296	1.414		
8	0.081	0.135	0.189	0.269	0.404	0.539	0.673	0.808	0.943	1.077	1.212	1.347				
9	0.091	0.152	0.212	0.303	0.455	0.606	0.758	0.909	1.061	1.212	1.364					
10	0.101	0.168	0.236	0.337	0.505	0.673	0.842	1.010	1.178	1.347						
12	0.121	0.202	0.283	0.404	0.606	0.808	1.010	1.212	1.414							
14	0.141	0.236	0.330	0.471	0.707	0.943	1.178	1.414								
16	0.162	0.269	0.377	0.539	0.808	1.077	1.347									

## 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 14 to 28" (20" recommended to take care of uneven terrain or boom movements).

- ISO – flow, color and outer dimensions
- Working pressure – 20 to 70 PSI
- Recommended for TWIN sprayers
- SYNTAL – precision moulded thermoplastic
- CERAMIC – extremely high durability
- COLOR TIPS – for safe and easy handling

PSI	GPM	🌿	GPA at MPH							
			6	7	8	10	12	14	16	18

20	0.053	F	2.6	2.3	2.0	1.6	1.3	1.1	1.0	0.9
30	0.065	F	3.2	2.8	2.4	1.9	1.6	1.4	1.2	1.1
40	0.075	F	3.7	3.2	2.8	2.2	1.9	1.6	1.4	1.2
50	0.084	F	4.2	3.6	3.1	2.5	2.1	1.8	1.6	1.4
60	0.092	F	4.5	3.9	3.4	2.7	2.3	1.9	1.7	1.5
70	0.099	F	4.9	4.2	3.7	2.9	2.5	2.1	1.8	1.6
			SYNTAL-CT	371964	(12 pcs. 750634)	SYNTAL-S	371963	(12 pcs. 750635)		

20	0.071	F	3.5	3.0	2.6	2.1	1.8	1.5	1.3	1.2
30	0.087	F	4.3	3.7	3.2	2.6	2.1	1.8	1.6	1.4
40	0.100	F	5.0	4.2	3.7	3.0	2.5	2.1	1.9	1.7
50	0.112	F	5.5	4.7	4.2	3.3	2.8	2.4	2.1	1.8
60	0.122	F	6.1	5.2	4.5	3.6	3.0	2.6	2.3	2.0
70	0.132	F	6.5	5.6	4.9	3.9	3.3	2.8	2.5	2.2
			SYNTAL-CT	371764	(12 pcs. 755627)	SYNTAL-S	371706	(12 pcs. 755643)		

20	0.106	M	5.3	4.5	3.9	3.2	2.6	2.3	2.0	1.8
30	0.130	F	6.4	5.5	4.8	3.9	3.2	2.8	2.4	2.1
40	0.150	F	7.4	6.4	5.6	4.5	3.7	3.2	2.8	2.5
50	0.168	F	8.3	7.1	6.2	5.0	4.2	3.6	3.1	2.8
60	0.184	F	9.1	7.8	6.8	5.5	4.5	3.9	3.4	3.0
70	0.198	F	9.8	8.4	7.4	5.9	4.9	4.2	3.7	3.3
			SYNTAL-CT	371765	(12 pcs. 755628)	SYNTAL-S	371707	(12 pcs. 755646)		
			CERAMIC-CT	371772	(12 pcs. 755635)	CERAMIC-S	371738	(12 pcs. 755667)		

20	0.144	M	7.0	6.0	5.3	4.2	3.5	3.0	2.6	2.3
30	0.173	M	8.6	7.3	6.4	5.1	4.3	3.7	3.2	2.9
40	0.200	F	9.9	8.5	7.4	5.9	5.0	4.2	3.7	3.3
50	0.224	F	11.1	9.5	8.3	6.6	5.5	4.7	4.2	3.7
60	0.245	F	12.1	10.4	9.1	7.3	6.1	5.2	4.5	4.0
70	0.265	F	13.1	11.2	9.8	7.9	6.5	5.6	4.9	4.4
			SYNTAL-CT	371766	(12 pcs. 755629)	SYNTAL-S	371708	(12 pcs. 755649)		
			CERAMIC-CT	371773	(12 pcs. 755636)	CERAMIC-S	371739	(12 pcs. 755670)		

20	0.177	M	8.8	7.5	6.6	5.3	4.4	3.8	3.3	2.9
30	0.217	M	10.7	9.2	8.0	6.4	5.4	4.6	4.0	3.6
40	0.250	M	12.4	10.6	9.3	7.4	6.2	5.3	4.6	4.1
50	0.280	M	13.8	11.9	10.4	8.3	6.9	5.9	5.2	4.6
60	0.306	F	15.2	13.0	11.4	9.1	7.6	6.5	5.7	5.1
70	0.331	F	16.4	14.0	12.3	9.8	8.2	7.0	6.1	5.5
			SYNTAL-CT	371950	(12 pcs. 750626)	SYNTAL-S	371946	(12 pcs. 750628)		

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

PSI	GPA	🌿	GPA at MPH							
			6	7	8	10	12	15	20	25

03-Blue	20	0.212	M	10.5	9.0	7.9	6.3	5.3	4.5	3.9	3.5
	30	0.260	M	12.9	11.0	9.6	7.7	6.4	5.5	4.8	4.3
	40	0.300	M	14.9	12.7	11.1	8.9	7.4	6.4	5.6	5.0
	50	0.335	M	16.6	14.2	12.5	10.0	8.3	7.1	6.2	5.5
	60	0.367	M	18.2	15.6	13.6	10.9	9.1	7.8	6.8	6.1
	70	0.397	M	19.6	16.8	14.7	11.8	9.8	8.4	7.4	6.5
			SYNTAL-CT	371767	(12 pcs. 755630)	SYNTAL-S	371709	(12 pcs. 755652)			
			CERAMIC-CT	371774	(12 pcs. 755637)	CERAMIC-S	371740	(12 pcs. 755673)			

04-Red	20	0.283	M	14.0	12.0	10.5	8.4	7.0	6.0	5.3	4.7
	30	0.346	M	17.1	14.7	12.9	10.3	8.6	7.3	6.4	5.7
	40	0.400	M	19.8	17.0	14.9	11.9	9.9	8.5	7.4	6.6
	50	0.447	M	22.1	19.0	16.6	13.3	11.1	9.5	8.3	7.4
	60	0.490	M	24.2	20.8	18.2	14.5	12.1	10.4	9.1	8.1
	70	0.529	M	26.2	22.5	19.6	15.7	13.1	11.2	9.8	8.7
			SYNTAL-CT	371768	(12 pcs. 755631)	SYNTAL-S	371710	(12 pcs. 755655)			
			CERAMIC-CT	371775	(12 pcs. 755638)	CERAMIC-S	371741	(12 pcs. 755676)			

05-Brown	20	0.354	C	17.5	15.0	13.1	10.5	8.8	7.5	6.6	5.8
	30	0.433	C	21.4	18.4	16.1	12.9	10.7	9.2	8.0	7.1
	40	0.500	M	24.8	21.2	18.6	14.9	12.4	10.6	9.3	8.3
	50	0.559	M	27.7	23.7	20.8	16.6	13.8	11.9	10.4	9.2
	60	0.612	M	30.3	26.0	22.7	18.2	15.2	13.0	11.4	10.1
	70	0.661	M	32.7	28.1	24.6	19.6	16.4	14.0	12.3	10.9
			SYNTAL-CT	371769	(12 pcs. 755632)	SYNTAL-S	371711	(12 pcs. 755658)			
			CERAMIC-CT	371776	(12 pcs. 755639)	CERAMIC-S	371742	(12 pcs. 755679)			

06-Grey	20	0.424	C	21.0	18.0	15.8	12.6	10.5	9.0	7.9	7.0
	30	0.520	C	25.7	22.0	19.3	15.4	12.9	11.0	9.6	8.6
	40	0.600	C	29.7	25.5	22.3	17.8	14.9	12.7	11.1	9.9
	50	0.671	C	33.2	28.5	24.9	19.9	16.6	14.2	12.5	11.1
	60	0.735	C	36.4	31.2	27.3	21.8	18.2	15.6	13.6	12.1
	70	0.794	C	39.3	33.7	29.5	23.6	19.6	16.8	14.7	13.1
			SYNTAL-CT	371770	(12 pcs. 755633)	SYNTAL-S	371712	(12 pcs. 755661)			
			CERAMIC-CT	371777	(12 pcs. 755640)	CERAMIC-S	371743	(12 pcs. 755682)			

08-White	20	0.566	VC	28.0	24.0	21.0	16.8	14.0	12.0	10.5	9.3
	30	0.693	C	34.3	29.4	25.7	20.6	17.1	14.7	12.9	11.4
	40	0.800	C	39.6	33.9	29.7	23.8	19.8	17.0	14.9	13.2
	50	0.894	C	44.3	37.9	33.2	26.6	22.1	19.0	16.6	14.8
	60	0.980	C	48.5	41.6	36.4	29.1	24.2	20.8	18.2	16.2
	70	1.058	C	52.4	44.9	39.3	31.4	26.2	22.5	19.6	17.5
			SYNTAL-CT	371771	(12 pcs. 755634)	SYNTAL-S	371713	(12 pcs. 755664)			

10-Light blue	20	0.707	VC	35.0	30.0	26.3	21.0	17.5	15.0	13.1	11.7
	30	0.866	VC	42.9	36.7	32.2	25.7	21.4	18.4	16.1	14.3
	40	1.000	VC	49.5	42.4	37.1	29.7	24.8	21.2	18.6	16.5
	50	1.118	VC	55.3	47.4	41.5	33.2	27.7	23.7	20.8	18.4
	60	1.225	C	60.6	52.0	45.5	36.4	30.3	26.0	22.7	20.2
	70	1.323	C	65.5	56.1	49.1	39.3	32.7	28.1	24.6	21.8
			SYNTAL-CT	371970	(12 pcs. 750636)	SYNTAL-S	371966	(12 pcs. 750638)			

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



# HARDI 4110 - Standard flat fan nozzles



All-round flat fan nozzles. 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 14" to 28" (20" recommended to take care of uneven terrain or boom movements). The 4110 nozzle is an old HARDI nozzle and the color code, dimension and flow is not following ISO standard.

- Working pressure – 20 to 70 PSI
- Volume rate – 1.6 to 40 GPM (at 10 MPH)
- SYNTAL – precision moulded thermoplastic
- COLOR TIPS – for safe and easy handling

	PSI	GPM	F	GPH at MPH								
				6	7	8	10	12	14	16	18	
<b>4110-08-Lilac</b>	20	0.054	F	2.7	2.3	2.0	1.6	1.3	1.2	1.0	0.9	
	30	0.067	F	3.3	2.8	2.5	2.0	1.7	1.4	1.2	1.1	
	40	0.077	F	3.8	3.3	2.9	2.3	1.9	1.6	1.4	1.3	
	50	0.086	F	4.3	3.7	3.2	2.6	2.1	1.8	1.6	1.4	
	60	0.094	F	4.7	4.0	3.5	2.8	2.3	2.0	1.8	1.6	
	70	0.102	F	5.0	4.3	3.8	3.0	2.5	2.2	1.9	1.7	
		SYNTAL-CT 371469 (12 pcs. 750325)			SYNTAL-S 370655 (12 pcs. 755688)							

	PSI	GPM	F	GPH at MPH								
				6	7	8	10	12	14	16	18	
<b>4110-10-Brown</b>	20	0.085	F	4.2	3.6	3.2	2.5	2.1	1.8	1.6	1.4	
	30	0.104	F	5.1	4.4	3.9	3.1	2.6	2.2	1.9	1.7	
	40	0.120	F	5.9	5.1	4.5	3.6	3.0	2.5	2.2	2.0	
	50	0.134	F	6.6	5.7	5.0	4.0	3.3	2.8	2.5	2.2	
	60	0.147	F	7.3	6.2	5.5	4.4	3.6	3.1	2.7	2.4	
	70	0.159	F	7.9	6.7	5.9	4.7	3.9	3.4	2.9	2.6	
		SYNTAL-CT 371470 (12 pcs. 750326)			SYNTAL-S 370657 (12 pcs. 755388)							

	PSI	GPM	F	GPH at MPH								
				6	7	8	10	12	14	16	18	
<b>4110-12-Yellow</b>	20	0.134	F	6.7	5.7	5.0	4.0	3.3	2.9	2.5	2.2	
	30	0.165	F	8.1	7.0	6.1	4.9	4.1	3.5	3.1	2.7	
	40	0.190	F	9.4	8.1	7.1	5.6	4.7	4.0	3.5	3.1	
	50	0.212	F	10.5	9.0	7.9	6.3	5.3	4.5	3.9	3.5	
	60	0.233	F	11.5	9.9	8.6	6.9	5.8	4.9	4.3	3.8	
	70	0.251	F	12.4	10.7	9.3	7.5	6.2	5.3	4.7	4.1	
		SYNTAL-CT 371471 (12 pcs. 750327)			SYNTAL-S 370661 (12 pcs. 755391)							

	PSI	GPM	M	GPH at MPH								
				6	7	8	10	12	14	16	18	
<b>4110-14-Orange</b>	20	0.163	M	8.1	6.9	6.0	4.8	4.0	3.5	3.0	2.7	
	30	0.199	M	9.9	8.5	7.4	5.9	4.9	4.2	3.7	3.3	
	40	0.230	F	11.4	9.8	8.5	6.8	5.7	4.9	4.3	3.8	
	50	0.257	F	12.7	10.9	9.5	7.6	6.4	5.5	4.8	4.2	
	60	0.282	F	13.9	12.0	10.5	8.4	7.0	6.0	5.2	4.6	
	70	0.304	F	15.1	12.9	11.3	9.0	7.5	6.5	5.6	5.0	
		SYNTAL-CT 371472 (12 pcs. 750328)			SYNTAL-S 370672 (12 pcs. 755394)							

	PSI	GPM	M	GPH at MPH								
				6	7	8	10	12	14	16	18	
<b>4110-16-Red</b>	20	0.198	M	9.8	8.4	7.4	5.9	4.9	4.2	3.7	3.3	
	30	0.242	M	12.0	10.3	9.0	7.2	6.0	5.1	4.5	4.0	
	40	0.280	F	13.9	11.9	10.4	8.3	6.9	5.9	5.2	4.6	
	50	0.313	F	15.5	13.3	11.6	9.3	7.7	6.6	5.8	5.2	
	60	0.343	F	17.0	14.5	12.7	10.2	8.5	7.3	6.4	5.7	
	70	0.370	F	18.3	15.7	13.8	11.0	9.2	7.9	6.9	6.1	
		SYNTAL-CT 371473 (12 pcs. 750329)			SYNTAL-S 370683 (12 pcs. 755397)							

	PSI	GPM	M	GPA at MPH								
				6	7	8	10	12	14	16	18	
<b>4110-18-White</b>	20	0.233	M	11.6	9.9	8.7	6.9	5.8	5.0	4.3	3.9	
	30	0.286	M	14.1	12.1	10.6	8.5	7.1	6.1	5.3	4.7	
	40	0.330	M	16.3	14.0	12.3	9.8	8.2	7.0	6.1	5.4	
	50	0.369	F	18.3	15.7	13.7	11.0	9.1	7.8	6.8	6.1	
	60	0.404	F	20.0	17.1	15.0	12.0	10.0	8.6	7.5	6.7	
	70	0.437	F	21.6	18.5	16.2	13.0	10.8	9.3	8.1	7.2	
		SYNTAL-CT 371474 (12 pcs. 750330)			SYNTAL-S 370685 (12 pcs. 755424)							

	PSI	GPM	M	GPA at MPH								
				6	7	8	10	12	14	16	18	
<b>4110-20-Green</b>	20	0.283	M	14.0	12.0	10.5	8.4	7.0	6.0	5.3	4.7	
	30	0.346	M	17.1	14.7	12.9	10.3	8.6	7.3	6.4	5.7	
	40	0.400	M	19.8	17.0	14.9	11.9	9.9	8.5	7.4	6.6	
	50	0.447	F	22.1	19.0	16.6	13.3	11.1	9.5	8.3	7.4	
	60	0.490	F	24.2	20.8	18.2	14.5	12.1	10.4	9.1	8.1	
	70	0.529	F	26.3	22.5	19.6	15.7	13.1	11.2	9.8	8.7	
		SYNTAL-CT 371475 (12 pcs. 750331)			SYNTAL-S 370694 (12 pcs. 755241)							

	PSI	GPM	M	GPA at MPH								
				6	7	8	10	12	14	16	18	
<b>4110-24-Turquoise</b>	20	0.375	M	18.6	15.9	13.9	11.1	9.3	8.0	7.0	6.2	
	30	0.459	M	22.7	19.5	17.0	13.6	11.4	9.7	8.5	7.6	
	40	0.530	M	26.2	22.5	19.7	15.7	13.1	11.2	9.8	8.7	
	50	0.593	M	29.3	25.1	22.0	17.6	14.7	12.6	11.0	9.8	
	60	0.649	F	32.1	27.5	24.1	19.3	16.1	13.8	12.0	10.7	
	70	0.701	F	34.7	29.7	26.0	20.8	17.4	14.6	13.0	11.6	
		SYNTAL-CT 371476 (12 pcs. 750332)			SYNTAL-S 370705 (12 pcs. 755274)							

	PSI	GPM	C	GPA at MPH								
				6	7	8	10	12	14	16	18	
<b>4110-30-Blue</b>	20	0.523	C	25.9	22.2	19.4	15.5	13.0	11.1	9.7	8.6	
	30	0.641	M	31.7	27.2	23.8	19.0	15.9	13.6	11.9	10.6	
	40	0.740	M	36.6	31.4	27.5	22.0	18.3	15.7	13.7	12.2	
	50	0.827	M	41.0	35.1	30.7	24.6	20.5	17.6	15.4	13.7	
	60	0.906	M	44.9	38.5	33.6	26.9	22.4	19.2	16.8	15.0	
	70	0.979	M	48.5	41.5	36.3	29.1	24.2	20.8	18.2	16.2	
		SYNTAL-CT 371477 (12 pcs. 750333)			SYNTAL-S 370716 (12 pcs. 755400)							

	PSI	GPM	C	GPA at MPH								
				6	7	8	10	12	14	16	18	
<b>4110-36-Grey</b>	20	0.721	C	35.7	30.6	26.8	21.4	17.9	15.3	13.4	11.9	
	30	0.883	C	43.7	37.5	32.8	26.2	21.9	18.7	16.4	14.6	
	40	1.020	C	50.5	43.3	37.9	30.3	25.2	21.6	18.9	16.8	
	50	1.140	C	56.4	48.4	42.3	33.9	28.2	24.2	21.2	18.8	
	60	1.249	C	61.8	53.0	46.4	37.1	30.9	26.5	23.2	20.6	
	70	1.349	C	66.8	57.3	50.1	40.1	33.4	28.6	25.2	22.3	
		SYNTAL-CT 371478 (12 pcs. 750334)			SYNTAL-S 370727 (12 pcs. 755403)							

	PSI	GPM	C	GPA at MPH								
				6	7	8	10	12	14	16	18	
<b>4110-44</b>	20	0.92	C	46.3	39.7	34.7	27.8	23.2	19.9	17.4	15.4	
	30	1.13	C	56.7	48.6	42.5	34.0	28.4	24.3	21.3	18.9	
	40	1.30	C	61.3	52.5	46.0	36.8	30.6	26.3	23.0	20.4	
	50	1.46	C	73.2	62.8	54.9	43.9	36.6	31.4	27.5	24.4	
	60	1.60	C	80.2	68.8	60.2	48.1	40.1	34.4	30.1	26.7	
	70	1.72	C	86.7	74.3	65.0	52.0	43.3	37.1	32.5	28.9	
		SYNTAL-S 370731										

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

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



# 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.

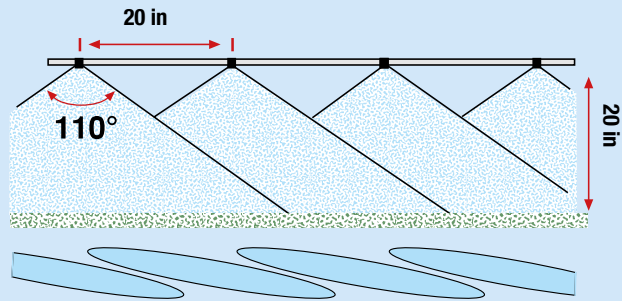
- ISO – Flow, color and outer dimensions
- Working pressure – 20 to 70 PSI
- Restrictor designed for minimum chemical residues
- SYNTAL – precision moulded thermoplastic
- CERAMIC – extremely high durability
- COLOR TIPS – for safe and easy handling



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

This nozzle will give you excellent and uniform liquid distribution at boom heights from 14" to 28" (20" recommended to take care of uneven terrain or boom movements).

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.



PSI	GPM	Spray Quality	GPA at MPH								
			6	7	8	10	12	14	16	18	
01-Orange	20	0.071	M	3.5	3.0	2.6	2.1	1.8	1.5	1.3	1.2
	30	0.087	M	4.3	3.7	3.2	2.6	2.1	1.8	1.6	1.4
	40	0.100	M	5.0	4.2	3.7	3.0	2.5	2.1	1.9	1.7
	50	0.112	M	5.5	4.7	4.2	3.3	2.8	2.4	2.1	1.8
	60	0.122	M	6.1	5.2	4.5	3.6	3.0	2.6	2.3	2.0
	70	0.132	F	6.5	5.6	4.9	3.9	3.3	2.8	2.5	2.2
				SYNTAL-CT 371837 (12 pcs. 755708) CERAMIC-CT371842 (12 pcs. 755713)	SYNTAL-S 371817 (12 pcs. 755698) CERAMIC-S 371822 (12 pcs. 755703)						

PSI	GPM	Spray Quality	l/ha at km/h								
			6	7	8	10	12	14	16	18	
015-Green	20	0.106	M	5.3	4.5	3.9	3.2	2.6	2.3	2.0	1.8
	30	0.130	M	6.4	5.5	4.8	3.9	3.2	2.8	2.4	2.1
	40	0.150	M	7.4	6.4	5.6	4.5	3.7	3.2	2.8	2.5
	50	0.168	M	8.3	7.1	6.2	5.0	4.2	3.6	3.1	2.8
	60	0.184	M	9.1	7.8	6.8	5.5	4.5	3.9	3.4	3.0
	70	0.198	M	9.8	8.4	7.4	5.9	4.9	4.2	3.7	3.3
				SYNTAL-CT 371838 (12 pcs. 755709) CERAMIC-CT371843 (12 pcs. 755714)	SYNTAL-S 371818 (12 pcs. 755699) CERAMIC-S 371823 (12 pcs. 755704)						

PSI	GPM	Spray Quality	l/ha at km/h								
			6	7	8	10	12	14	16	18	
02-Yellow	20	0.144	M	7.0	6.0	5.3	4.2	3.5	3.0	2.6	2.3
	30	0.173	M	8.6	7.3	6.4	5.1	4.3	3.7	3.2	2.9
	40	0.200	M	9.9	8.5	7.4	5.9	5.0	4.2	3.7	3.3
	50	0.224	M	11.1	9.5	8.3	6.6	5.5	4.7	4.2	3.7
	60	0.245	M	12.1	10.4	9.1	7.3	6.1	5.2	4.5	4.0
	70	0.265	M	13.1	11.2	9.8	7.9	6.5	5.6	4.9	4.4
				SYNTAL-CT 371839 (12 pcs. 755710) CERAMIC-CT371844 (12 pcs. 755715)	SYNTAL-S 371819 (12 pcs. 755700) CERAMIC-S 371824 (12 pcs. 755705)						

PSI	GPM	Spray Quality	l/ha at km/h								
			6	7	8	10	12	14	16	18	
025-Lilac	20	0.177	C	8.8	7.5	6.6	5.3	4.4	3.8	3.3	2.9
	30	0.217	C	10.7	9.2	8.0	6.4	5.4	4.6	4.0	3.6
	40	0.250	M	12.4	10.6	9.3	7.4	6.2	5.3	4.6	4.1
	50	0.280	M	13.8	11.9	10.4	8.3	6.9	5.9	5.2	4.6
	60	0.306	M	15.2	13.0	11.4	9.1	7.6	6.5	5.7	5.1
	70	0.331	M	16.4	14.0	12.3	9.8	8.2	7.0	6.1	5.5
				SYNTAL-CT 371958 (12 pcs. 750630) CERAMIC-CT371897 (12 pcs. 755816)	SYNTAL-S 371957 (12 pcs. 750632) CERAMIC-S371896 (12 pcs. 755818)						

PSI	GPM	Spray Quality	l/ha at km/h								
			6	7	8	10	12	14	16	18	
03-Blue	20	0.212	C	10.5	9.0	7.9	6.3	5.3	4.5	3.9	3.5
	30	0.260	C	12.9	11.0	9.6	7.7	6.4	5.5	4.8	4.3
	40	0.300	C	14.9	12.7	11.1	8.9	7.4	6.4	5.6	5.0
	50	0.335	C	16.6	14.2	12.5	10.0	8.3	7.1	6.2	5.5
	60	0.367	M	18.2	15.6	13.6	10.9	9.1	7.8	6.8	6.1
	70	0.397	M	19.6	16.8	14.7	11.8	9.8	8.4	7.4	6.5
				SYNTAL-CT 371840 (12 pcs. 755711) CERAMIC-CT371845 (12 pcs. 755716)	SYNTAL-S 371820 (12 pcs. 755701) CERAMIC-S 371825 (12 pcs. 755706)						

PSI	GPM	Spray Quality	l/ha at km/h								
			6	7	8	10	12	14	16	18	
04-Red	20	0.283	C	14.0	12.0	10.5	8.4	7.0	6.0	5.3	4.7
	30	0.346	C	17.1	14.7	12.9	10.3	8.6	7.3	6.4	5.7
	40	0.400	C	19.8	17.0	14.9	11.9	9.9	8.5	7.4	6.6
	50	0.447	C	22.1	19.0	16.6	13.3	11.1	9.5	8.3	7.4
	60	0.490	C	24.2	20.8	18.2	14.5	12.1	10.4	9.1	8.1
	70	0.529	M	26.2	22.5	19.6	15.7	13.1	11.2	9.8	8.7
				SYNTAL-CT371841 (12 pcs. 755712) CERAMIC-CT371846 (12 pcs. 755717)	SYNTAL-S371821 (12 pcs. 755702) CERAMIC-S371826 (12 pcs. 755707)						

PSI	GPM	Spray Quality	l/ha at km/h								
			6	7	8	10	12	14	16	18	
05-Brown	20	0.354	C	17.5	15.0	13.1	10.5	8.8	7.5	6.6	5.8
	30	0.433	C	21.4	18.4	16.1	12.9	10.7	9.2	8.0	7.1
	40	0.500	C	24.8	21.2	18.6	14.9	12.4	10.6	9.3	8.3
	50	0.559	C	27.7	23.7	20.8	16.6	13.8	11.9	10.4	9.2
	60	0.612	C	30.3	26.0	22.7	18.2	15.2	13.0	11.4	10.1
	70	0.661	C	32.7	28.1	24.6	19.6	16.4	14.0	12.3	10.9
				SYNTAL-CT 371894 (12 pcs. 755815) CERAMIC-CT371897 (12 pcs. 755816)	SYNTAL-S 371893 (12 pcs. 755817) CERAMIC-S371896 (12 pcs. 755818)						

= Spray quality:  
 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 MINIDRIFT air inclusion nozzles



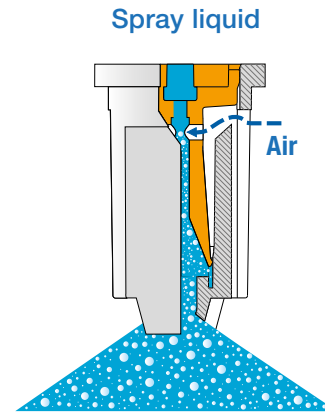
The HARDI MINIDRIFT nozzles can be used for spraying at sub-optimal weather conditions, when spraying cannot be postponed. The MINIDRIFT nozzle will at low pressures reduce drift to a minimum.

- Air inclusion nozzle
- Working pressure – 10 to 80 PSI
- ISO – flow, colors, sizes and nomenclature
- Application rates from 6 to 40 GPA (at 5 MPH)
- SYNTAL – precision moulded thermoplastic

This nozzle will give you excellent and uniform liquid distribution at boom heights from 16" to 35".

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.

PSI	GPM	Spray quality	GPA at MPH							
			6	7	8	10	12	14	16	18
20	0.106	C	5.3	4.5	3.9	3.2	2.6	2.3	2.0	1.8
30	0.130	C	6.4	5.5	4.8	3.9	3.2	2.8	2.4	2.1
40	0.150	C	7.4	6.4	5.6	4.5	3.7	3.2	2.8	2.5
50	0.168	C	8.3	7.1	6.2	5.0	4.2	3.6	3.1	2.8
60	0.184	M	9.1	7.8	6.8	5.5	4.5	3.9	3.4	3.0
70	0.198	M	9.8	8.4	7.4	5.9	4.9	4.2	3.7	3.3
80	0.212	M	10.5	9.1	7.9	6.3	5.2	4.5	3.9	3.5
SYNTAL-CT 372121 (12 pcs. 75083100)			SYNTAL-S 372111 (12 pcs. 75082100)							

PSI	GPM	Spray quality	GPA at MPH							
			6	7	8	10	12	14	16	18
20	0.212	VC	10.5	9.0	7.9	6.3	5.3	4.5	3.9	3.5
30	0.260	VC	12.9	11.0	9.6	7.7	6.4	5.5	4.8	4.3
40	0.300	VC	14.9	12.7	11.1	8.9	7.4	6.4	5.6	5.0
50	0.335	C	16.6	14.2	12.5	10.0	8.3	7.1	6.2	5.5
60	0.367	C	18.2	15.6	13.6	10.9	9.1	7.8	6.8	6.1
70	0.397	C	19.6	16.8	14.7	11.8	9.8	8.4	7.4	6.5
80	0.424	M	21.1	18.0	15.8	12.6	10.5	9.0	7.9	7.0
SYNTAL-CT 372124 (12 pcs. 75083400)			SYNTAL-S 372114 (12 pcs. 75082400)							

PSI	GPM	Spray quality	GPA at MPH							
			6	7	8	10	12	14	16	18
20	0.144	VC	7.0	6.0	5.3	4.2	3.5	3.0	2.6	2.3
30	0.173	C	8.6	7.3	6.4	5.1	4.3	3.7	3.2	2.9
40	0.200	C	9.9	8.5	7.4	5.9	5.0	4.2	3.7	3.3
50	0.224	C	11.1	9.5	8.3	6.6	5.5	4.7	4.2	3.7
60	0.245	C	12.1	10.4	9.1	7.3	6.1	5.2	4.5	4.0
70	0.265	M	13.1	11.2	9.8	7.9	6.5	5.6	4.9	4.4
80	0.282	M	14.1	12.1	10.5	8.4	7.1	6.1	5.2	4.5
SYNTAL-CT 372122 (12 pcs. 75083200)			SYNTAL-S 372112 (12 pcs. 75082200)							

PSI	GPM	Spray quality	GPA at MPH							
			6	7	8	10	12	14	16	18
10	0.201	VC	9.9	8.5	7.5	6	5	4.3	3.7	3.3
20	0.283	VC	14.0	12.0	10.5	8.4	7.0	6.0	5.3	4.7
30	0.346	VC	17.1	14.7	12.9	10.3	8.6	7.3	6.4	5.7
40	0.400	VC	19.8	17.0	14.9	11.9	9.9	8.5	7.4	6.6
50	0.447	VC	22.1	19.0	16.6	13.3	11.1	9.5	8.3	7.4
60	0.490	C	24.2	20.8	18.2	14.5	12.1	10.4	9.1	8.1
70	0.529	C	26.2	22.5	19.6	15.7	13.1	11.2	9.8	8.7
80	0.566	C	28.0	24.0	21.0	16.8	14.0	12.0	10.5	9.3
SYNTAL-CT 372125 (12 pcs. 75083500)			SYNTAL-S 372115 (12 pcs. 75082500)							

PSI	GPM	Spray quality	GPA at MPH							
			6	7	8	10	12	14	16	18
20	0.177	VC	8.8	7.5	6.6	5.3	4.4	3.8	3.3	2.9
30	0.217	VC	10.7	9.2	8.0	6.4	5.4	4.6	4.0	3.6
40	0.250	C	12.4	10.6	9.3	7.4	6.2	5.3	4.6	4.1
50	0.280	C	13.8	11.9	10.4	8.3	6.9	5.9	5.2	4.6
60	0.306	C	15.2	13.0	11.4	9.1	7.6	6.5	5.7	5.1
70	0.331	M	16.4	14.0	12.3	9.8	8.2	7.0	6.1	5.5
80	0.354	M	17.5	12.4	13.1	10.5	8.8	7.5	6.6	5.8
SYNTAL-CT 372123 (12 pcs. 75083300)			SYNTAL-S 372113 (12 pcs. 75082300)							

PSI	GPM	Spray quality	GPA at MPH							
			6	7	8	10	12	14	16	18
10	0.25	VC	12.4	10.6	9.3	7.4	6.2	5.3	4.6	4.1
20	0.354	VC	17.5	15.0	13.1	10.5	8.8	7.5	6.6	5.8
30	0.433	VC	21.4	18.4	16.1	12.9	10.7	9.2	8.0	7.1
40	0.500	VC	24.8	21.2	18.6	14.9	12.4	10.6	9.3	8.3
50	0.559	VC	27.7	23.7	20.8	16.6	13.8	11.9	10.4	9.2
60	0.612	C	30.3	26.0	22.7	18.2	15.2	13.0	11.4	10.1
70	0.661	C	32.7	28.1	24.6	19.6	16.4	14.0	12.3	10.9
80	0.707	C	35.1	30.1	26.2	21.1	17.5	15.1	13.1	11.7
SYNTAL-CT 372126 (12 pcs. 75083600)			SYNTAL-S 372116 (12 pcs. 75082600)							

= Spray quality:  
 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.



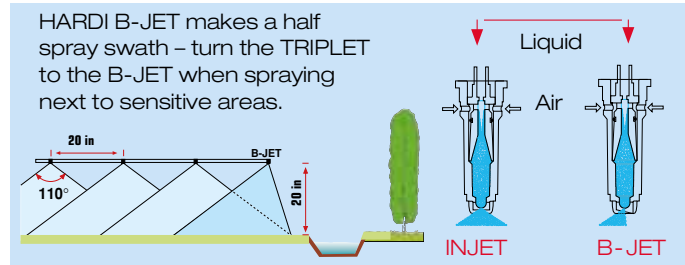
# HARDI ISO INJET air inclusion nozzles



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, colors and nomenclature
- Application rates from 3 to 40 GPA (at 10 MPH)
- Pressure range – 40 to 120 PSI
- 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.



	PSI	GPM	VC	GPA at MPH							
				6	7	8	10	12	14	16	18
01-Orange	40	0.100	VC	5.0	4.2	3.7	3.0	2.5	2.1	1.9	1.7
	60	0.122	VC	6.1	5.2	4.5	3.6	3.0	2.6	2.3	2.0
	70	0.132	VC	6.5	5.6	4.9	3.9	3.6	2.8	2.5	2.2
	80	0.141	C	7.0	6.0	5.3	4.2	3.5	3.0	2.6	2.3
	100	0.158	C	7.8	6.7	5.9	4.7	3.9	3.4	2.9	2.6
	120	0.173	C	8.6	7.3	6.4	5.1	4.3	3.7	3.2	2.9
				SYNTAL-S 371926 (12 pcs. 75078800)							

	PSI	GPM	VC	GPA at MPH							
				6	7	8	10	12	14	16	18
015-Green	40	0.150	VC	7.4	6.4	5.6	4.5	3.7	3.2	2.8	2.5
	60	0.184	VC	9.1	7.8	6.8	5.5	4.5	3.9	3.4	3.0
	70	0.198	VC	9.8	8.4	7.4	5.9	4.9	4.2	3.7	3.3
	80	0.212	VC	10.5	9.0	7.9	6.3	5.3	4.5	3.9	3.5
	100	0.237	VC	11.7	10.1	8.8	7.0	5.9	5.0	4.4	3.9
	120	0.260	VC	12.9	11.0	9.6	7.7	6.4	5.5	4.8	4.3
				SYNTAL-S 371872 (12 pcs. 75081500)							

	PSI	GPM	VC	GPA at MPH							
				6	7	8	10	12	14	16	18
02-Yellow	40	0.200	VC	9.9	8.5	7.4	5.9	5.0	4.2	3.7	3.3
	60	0.245	VC	12.1	10.4	9.1	7.3	6.1	5.2	4.5	4.0
	70	0.265	VC	13.1	11.2	9.8	7.9	6.5	5.6	4.9	4.4
	80	0.283	VC	14.0	12.0	10.5	8.4	7.0	6.0	5.3	4.7
	100	0.316	VC	15.7	13.4	11.7	9.4	7.8	6.7	5.9	5.2
	120	0.346	VC	17.1	14.7	12.9	10.3	8.6	7.3	6.4	5.7
				SYNTAL-S 371873 (12 pcs. 75081600)				SYNTAL-S B-JET 371930 (2 pcs. 750620)			

	PSI	GPM	VC	GPA at MPH							
				6	7	8	10	12	14	16	18
025-Lilac	40	0.250	VC	12.4	10.6	9.3	7.4	6.2	5.3	4.6	4.1
	60	0.306	VC	15.2	13.0	11.4	9.1	7.6	6.5	5.7	5.1
	70	0.331	VC	16.4	14.0	12.3	9.8	8.2	7.0	6.1	5.5
	80	0.354	VC	17.5	15.0	13.1	10.5	8.8	7.5	6.6	5.8
	100	0.395	VC	19.6	16.8	14.7	11.7	9.8	8.4	7.3	6.5
	120	0.433	VC	21.4	18.4	16.1	12.9	10.7	9.2	8.0	7.1
				SYNTAL-S 371874 (12 pcs. 75081700)				SYNTAL-S B-JET 371877 (2 pcs. 755806)			

	PSI	GPM	VC	GPA at MPH							
				6	7	8	10	12	14	16	18
03-Blue	40	0.300	VC	14.9	12.7	11.1	8.9	7.4	6.4	5.6	5.0
	60	0.367	VC	18.2	15.6	13.6	10.9	9.1	7.8	6.8	6.1
	70	0.397	VC	19.6	16.8	14.7	11.8	9.8	8.4	7.4	6.5
	80	0.424	VC	21.0	18.0	15.8	12.6	10.5	9.0	7.9	7.0
	100	0.474	VC	23.5	20.1	17.6	14.1	11.7	10.1	8.8	7.8
	120	0.520	VC	25.7	22.0	19.3	15.4	12.9	11.0	9.6	8.6
				SYNTAL-S 371875 (12 pcs. 75081800)				SYNTAL-S B-JET 371870 (2 pcs. 755799)			

	PSI	GPM	VC	GPA at MPH							
				6	7	8	10	12	14	16	18
04-Red	40	0.400	VC	19.8	17.0	14.9	11.9	9.9	8.5	7.4	6.6
	60	0.490	VC	24.2	20.8	18.2	14.5	12.1	10.4	9.1	8.1
	70	0.529	VC	26.2	22.5	19.6	15.7	13.1	11.2	9.8	8.7
	80	0.566	VC	28.0	24.0	21.0	16.8	14.0	12.0	10.5	9.3
	100	0.632	VC	31.3	26.8	23.5	18.8	15.7	13.4	11.7	10.4
	120	0.693	VC	34.3	29.4	25.7	20.6	17.1	14.7	12.9	11.4
				SYNTAL-S 371876 (12 pcs. 75081900)				SYNTAL-S B-JET 371871 (2 pcs. 755800)			

	PSI	GPM	VC	GPA at MPH							
				6	7	8	10	12	14	16	18
05-Brown	40	0.500	VC	24.8	21.2	18.6	14.9	12.4	10.6	9.3	8.3
	60	0.612	VC	30.3	26.0	22.7	18.2	15.2	13.0	11.4	10.1
	70	0.661	VC	32.7	28.1	24.6	19.6	16.4	14.0	12.3	10.9
	80	0.707	VC	35.0	30.0	26.3	21.0	17.5	15.0	13.1	11.7
	100	0.791	VC	39.1	33.5	29.3	23.5	19.6	16.8	14.7	13.0
	120	0.866	VC	42.9	36.7	32.2	25.7	21.4	18.4	16.1	14.3
				SYNTAL-S 371927 (12 pcs. 75078900)							

	PSI	GPM	VC	GPA at MPH							
				6	7	8	10	12	14	16	18
06-Grey	40	0.600	VC	29.7	25.5	22.3	17.8	14.9	12.7	11.1	9.9
	60	0.735	VC	36.4	31.2	27.3	21.8	18.2	15.6	13.6	12.1
	70	0.794	VC	39.3	33.7	29.5	23.6	19.6	16.8	14.7	13.1
	80	0.849	VC	42.0	36.0	31.5	25.2	21.0	18.0	15.8	14.0
	100	0.949	VC	47.0	40.3	35.2	28.2	23.5	20.1	17.6	15.7
	120	1.039	VC	51.4	44.1	38.6	30.9	25.7	22.0	19.3	17.1
				SYNTAL-S 371928 (12 pcs. 7507900)							

	PSI	GPM	VC	GPA at MPH							
				6	7	8	10	12	14	16	18
08-White	40	0.800	VC	39.6	33.9	29.7	23.8	19.8	17.0	14.9	13.2
	60	0.980	VC	48.5	41.6	36.4	29.1	24.2	20.8	18.2	16.2
	70	1.058	VC	52.4	44.9	39.3	31.4	26.2	22.5	19.6	17.5
	80	1.131	VC	56.0	48.0	42.0	33.6	28.0	24.0	21.0	18.7
	100	1.265	VC	62.6	53.7	47.0	37.6	31.3	26.8	23.5	20.9
	120	1.386	VC	68.6	58.8	51.4	41.2	34.3	29.4	25.7	22.9
				SYNTAL-S 371929 (12 pcs. 75079100)							

= Spray quality:  
 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 MINIDRIFT DUO air inclusion nozzles

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

### Air inclusion nozzle

- Working pressure – 20 TO 80 psi
- ISO flow, colors, sizes and nomenclature
- 30° forward and backward angle
- Application rates from 7 to 35 GPA (at 6 MPH)
- SYNTAL – precision moulded thermoplastic

This compact flat spray air injector nozzle offers droplet spectrum from medium to very coarse; safe for drift control but without risking poor coverage and deposition on leaves. The two angled fans increase the number of droplets and impacts on target compared to normal air injector nozzles.

A good coverage on dense foliage and vertical targets. The injector can easily be removed for cleaning the nozzle.

The HARDI MINIDRIFT DUO nozzles can be mounted using the 334083 ISO cap.



	PSI	GPM	Spray quality	GPA at MPH							
				6	7	8	10	12	14	16	18
02-Yellow	20	0.144	VC	7.0	6.0	5.3	4.2	3.5	3.0	2.6	2.3
	30	0.173	C	8.6	7.3	6.4	5.1	4.3	3.7	3.2	2.9
	40	0.200	C	9.9	8.5	7.4	5.9	5.0	4.2	3.7	3.3
	50	0.224	C	11.1	9.5	8.3	6.6	5.5	4.7	4.2	3.7
	60	0.245	C	12.1	10.4	9.1	7.3	6.1	5.2	4.5	4.0
	80	0.282	M	14.1	12.1	10.5	8.4	7.1	6.1	5.2	4.5
				SYNTAL-S 37218400							

	PSI	GPM	Spray quality	GPA at MPH							
				6	7	8	10	12	14	16	18
025-Lilac	20	0.177	VC	8.8	7.5	6.6	5.3	4.4	3.8	3.3	2.9
	30	0.217	VC	10.7	9.2	8.0	6.4	5.4	4.6	4.0	3.6
	40	0.250	C	12.4	10.6	9.3	7.4	6.2	5.3	4.6	4.1
	50	0.280	C	13.8	11.9	10.4	8.3	6.9	5.9	5.2	4.6
	60	0.306	C	15.2	13.0	11.4	9.1	7.6	6.5	5.7	5.1
	80	0.354	M	17.5	14.0	12.3	9.8	8.2	7.0	6.1	5.5
				SYNTAL-S 37218500							

	PSI	GPM	Spray quality	GPA at MPH							
				6	7	8	10	12	14	16	18
03-Blue	20	0.212	VC	10.5	9.0	7.9	6.3	5.3	4.5	3.9	3.5
	30	0.260	VC	12.9	11.0	9.6	7.7	6.4	5.5	4.8	4.3
	40	0.300	C	14.9	12.7	11.1	8.9	7.4	6.4	5.6	5.0
	50	0.335	C	16.6	14.2	12.5	10.0	8.3	7.1	6.2	5.5
	60	0.367	M	18.2	15.6	13.6	10.9	9.1	7.8	6.8	6.1
	80	0.424	M	21.1	18.0	15.8	12.6	10.5	9.0	7.9	7.0
				SYNTAL-S 37218100							

	PSI	GPM	Spray quality	GPA at MPH							
				6	7	8	10	12	14	16	18
04-Red	20	0.283	VC	14.0	12.0	10.5	8.4	7.0	6.0	5.3	4.7
	30	0.346	C	17.1	14.7	12.9	10.3	8.6	7.3	6.4	5.7
	40	0.400	C	19.8	17.0	14.9	11.9	9.9	8.5	7.4	6.6
	50	0.447	C	22.1	19.0	16.6	13.3	11.1	9.5	8.3	7.4
	60	0.490	M	24.2	20.8	18.2	14.5	12.1	10.4	9.1	8.1
	80	0.529	M	26.2	22.5	19.6	15.7	13.1	11.2	9.8	8.7
				SYNTAL-S 37218200							

	PSI	GPM	Spray quality	GPA at MPH							
				6	7	8	10	12	14	16	18
05-Brown	20	0.354	VC	17.5	15.0	13.1	10.5	8.8	7.5	6.6	5.8
	30	0.433	C	21.4	18.4	16.1	12.9	10.7	9.2	8.0	7.1
	40	0.500	C	24.8	21.2	18.6	14.9	12.4	10.6	9.3	8.3
	50	0.559	C	27.7	23.7	20.8	16.6	13.8	11.9	10.4	9.2
	60	0.612	M	30.3	26.0	22.7	18.2	15.2	13.0	11.4	10.1
	80	0.707	M	35.1	30.1	26.2	21.1	17.5	15.1	13.1	11.7
				SYNTAL-S 37218300							

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





# HARDI DUOCAP

## Double-up your application

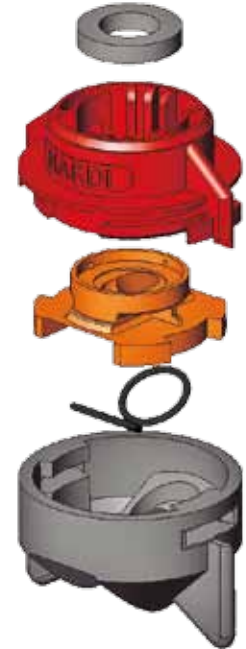
- Improved coverage
- Angled spray ensures penetration in dense crops
- Can hold all ISO nozzles
- 30° forward and backward angle

HARDI DUOCAP gives you higher volume rate while still maintaining proper droplet size.

Fitted with two FF or LD nozzles HARDI DUOCAP will give Fine to Medium spray, suitable for fungicide spraying.

Two different nozzles can be used. A Standard and a MINIDRIFT nozzle will give you the dual benefit of having Fine droplets, ensuring good coverage in the top of the crop and Coarse droplets, penetrating to the lower and more dense areas.

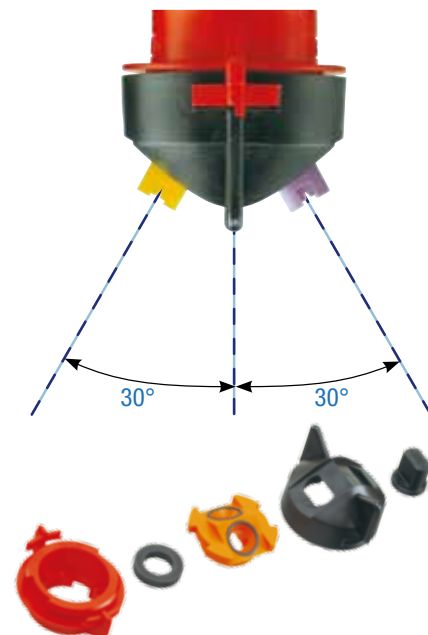
HARDI DUOCAP fitted with two MINIDRIFT nozzles will give superior penetration into dense crops like Potatoes and Soybeans.



## Calibration

If two ISO nozzles of the same size are used, they will apply the same volume as one ISO nozzle of the double size (use the application table of the double sized nozzle). If two nozzles of different sizes are used, the GPM at the chosen pressure for both nozzles must be added together, and the table below can be used to find the application volume.

GPM (2 nozzles)	GPA at MPH							
	6	7	8	10	12	14	16	18
0.20	9.85	8.44	7.39	5.91	4.93	4.22	3.69	3.28
0.26	13.07	11.20	9.80	7.84	6.53	5.60	4.90	4.36
0.33	16.34	14.00	12.25	9.80	8.17	7.00	6.13	5.45
0.40	19.60	16.80	14.70	11.76	9.80	8.40	7.35	6.53
0.46	22.87	19.60	17.15	13.72	11.43	9.80	8.58	7.62
0.53	26.14	22.40	19.60	15.68	13.07	11.20	9.80	8.71
0.59	29.40	25.20	22.05	17.64	14.70	12.60	11.03	9.80
0.66	32.67	28.00	24.50	19.60	16.34	14.00	12.25	10.89
0.73	35.94	30.80	26.95	21.56	17.97	15.40	13.48	11.98
0.79	39.25	33.65	29.44	23.55	19.63	16.82	14.72	13.08
0.86	42.52	36.45	31.89	25.51	21.26	18.22	15.95	14.17
0.92	45.69	39.16	34.27	27.41	22.84	19.58	17.13	15.23
0.98	48.36	41.45	36.27	29.02	24.18	20.73	18.14	16.12
1.06	52.32	44.85	39.24	31.39	26.16	22.42	19.62	17.44
1.12	55.59	47.65	41.69	33.35	27.79	23.82	20.85	18.53
1.19	58.86	50.45	44.14	35.31	29.43	25.22	22.07	19.62
1.26	62.12	53.25	46.59	37.27	31.06	26.62	23.30	20.71
1.32	65.39	56.05	49.04	39.23	32.69	28.02	24.52	21.80
1.39	68.66	58.85	51.49	41.19	34.33	29.42	25.75	22.89
1.45	71.92	61.65	53.94	43.15	35.96	30.82	26.97	23.97
1.52	75.19	64.45	56.39	45.11	37.60	32.22	28.20	25.06
1.59	78.46	67.25	58.84	47.07	39.23	33.62	29.42	26.15



The HARDI DUOCAP is delivered complete with 3 O-rings, and 3 plastic parts (note: nozzles are not included). (réf. 28063000).



## HARDI ISO F-80 – Flat fan nozzles

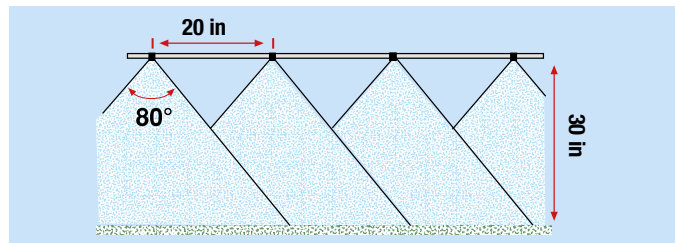


This nozzle has an 80° spray angle. On boom sizes from 80 ft to 132 ft the boom height is often higher than 20" above the target. 80° nozzles provide good coverage with reduced drift risk at these higher boom heights and are also adaptable to band spraying.

- ISO – flow, color and outer dimensions
- Spray angle – 80°
- Working pressure – 20 to 70 PSI
- 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 droplets.

For use in cotton, sugar cane, sugar beets etc. The 80° nozzles can be fitted on HARDI sprayers using the 334083 ISO/INJET cap.



	PSI	GPM	GPA at MPH								
			6	7	8	10	12	14	16	18	
<b>01-Orange</b>	20	0.071	-	3.5	3.0	2.6	2.1	1.8	1.5	1.3	1.2
	30	0.087	-	4.3	3.7	3.2	2.6	2.1	1.8	1.6	1.4
	40	0.100	-	5.0	4.2	3.7	3.0	2.5	2.1	1.9	1.7
	50	0.112	-	5.5	4.7	4.2	3.3	2.8	2.4	2.1	1.8
	60	0.122	-	6.1	5.2	4.5	3.6	3.0	2.6	2.3	2.0
	70	0.132	-	6.5	5.6	4.9	3.9	3.3	2.8	2.5	2.2
			SYNTAL-S 371931 (12 pcs. 750640)								

	bar	l/min	l/ha at km/h								
			6	7	8	10	12	14	16	18	
<b>02-Yellow</b>	20	0.144	-	7.0	6.0	5.3	4.2	3.5	3.0	2.6	2.3
	30	0.173	-	8.6	7.3	6.4	5.1	4.3	3.7	3.2	2.9
	40	0.200	-	9.9	8.5	7.4	5.9	5.0	4.2	3.7	3.3
	50	0.224	-	11.1	9.5	8.3	6.6	5.5	4.7	4.2	3.7
	60	0.245	-	12.1	10.4	9.1	7.3	6.1	5.2	4.5	4.0
	70	0.265	-	13.1	11.2	9.8	7.9	6.5	5.6	4.9	4.4
			SYNTAL-S 371933 (12 pcs. 750642)						CERAMIC-CT 371921 (12 pcs. 750603)		
			CERAMIC-S 371907 (12 pcs. 750610)								

	PSI	GPM	GPA at MPH								
			6	7	8	10	12	14	16	18	
<b>015-Green</b>	20	0.106	-	5.3	4.5	3.9	3.2	2.6	2.3	2.0	1.8
	30	0.130	-	6.4	5.5	4.8	3.9	3.2	2.8	2.4	2.1
	40	0.150	-	7.4	6.4	5.6	4.5	3.7	3.2	2.8	2.5
	50	0.168	-	8.3	7.1	6.2	5.0	4.2	3.6	3.1	2.8
	60	0.184	-	9.1	7.8	6.8	5.5	4.5	3.9	3.4	3.0
	70	0.198	-	9.8	8.4	7.4	5.9	4.9	4.2	3.7	3.3
			SYNTAL-S 371932 (12 pcs. 750641)			CERAMIC-CT 371920 (12 pcs. 750602)					
			CERAMIC-S 371906 (12 pcs. 750609)								

	bar	l/min	l/ha at km/h								
			6	7	8	10	12	14	16	18	
<b>03-Blue</b>	20	0.212	-	10.5	9.0	7.9	6.3	5.3	4.5	3.9	3.5
	30	0.260	-	12.9	11.0	9.6	7.7	6.4	5.5	4.8	4.3
	40	0.300	-	14.9	12.7	11.1	8.9	7.4	6.4	5.6	5.0
	50	0.335	-	16.6	14.2	12.5	10.0	8.3	7.1	6.2	5.5
	60	0.367	-	18.2	15.6	13.6	10.9	9.1	7.8	6.8	6.1
	70	0.397	-	19.6	16.8	14.7	11.8	9.8	8.4	7.4	6.5
			SYNTAL-S 371934 (12 pcs. 750643)			CERAMIC-CT 371922 (12 pcs. 750604)					
			CERAMIC-S 371908 (12 pcs. 750611)								



= Spray quality:

- 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.



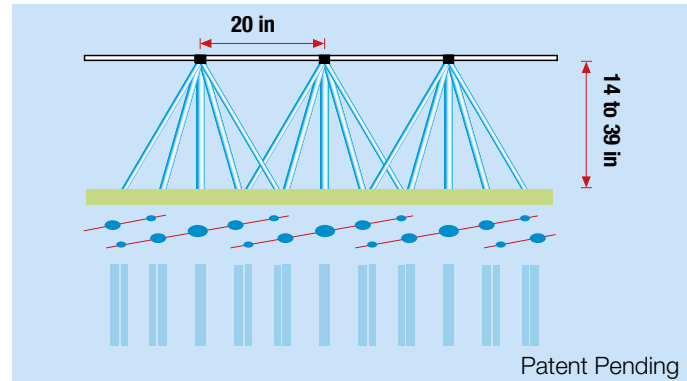


# HARDI QUINTASTREAM nozzles

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 minimize crop scorching
- Particularly important for wide booms at fast speeds
- ISO standard for easy calibration
- Turn and Clean key for restrictor removal
- Boom height 14" to 39"

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



	PSI	GPM	GPA at MPH								
			6	7	8	10	12	14	16	18	
<b>015-Green</b>	20	0.106	-	5.3	4.5	3.9	3.2	2.6	2.3	2.0	1.8
	30	0.130	-	6.4	5.5	4.8	3.9	3.2	2.8	2.4	2.1
	40	0.150	-	7.4	6.4	5.6	4.5	3.7	3.2	2.8	2.5
	50	0.168	-	8.3	7.1	6.2	5.0	4.2	3.6	3.1	2.8
	60	0.184	-	9.1	7.8	6.8	5.5	4.5	3.9	3.4	3.0
	70	0.198	-	9.8	8.4	7.4	5.9	4.9	4.2	3.7	3.3
			<b>COLORTIP</b>	372011 (6 pcs. 750680)				<b>SINGLE</b> 372002 (6 pcs. 750671)			

<b>02-Yellow</b>	20	0.144	-	7.0	6.0	5.3	4.2	3.5	3.0	2.6	2.3
	30	0.173	-	8.6	7.3	6.4	5.1	4.3	3.7	3.2	2.9
	40	0.200	-	9.9	8.5	7.4	5.9	5.0	4.2	3.7	3.3
	50	0.224	-	11.1	9.5	8.3	6.6	5.5	4.7	4.2	3.7
	60	0.245	-	12.1	10.4	9.1	7.3	6.1	5.2	4.5	4.0
	70	0.265	-	13.1	11.2	9.8	7.9	6.5	5.6	4.9	4.4
			<b>COLORTIP</b>	372012 (6 pcs. 750681)				<b>SINGLE</b> 372003 (6 pcs. 750672)			

<b>03-Blue</b>	20	0.212	-	10.5	9.0	7.9	6.3	5.3	4.5	3.9	3.5
	30	0.260	-	12.9	11.0	9.6	7.7	6.4	5.5	4.8	4.3
	40	0.300	-	14.9	12.7	11.1	8.9	7.4	6.4	5.6	5.0
	50	0.335	-	16.6	14.2	12.5	10.0	8.3	7.1	6.2	5.5
	60	0.367	-	18.2	15.6	13.6	10.9	9.1	7.8	6.8	6.1
	70	0.397	-	19.6	16.8	14.7	11.8	9.8	8.4	7.4	6.5
			<b>COLORTIP</b>	372013 (6 pcs. 750682)				<b>SINGLE</b> 372004 (6 pcs. 750673)			

<b>04-Red</b>	20	0.283	-	14.0	12.0	10.5	8.4	7.0	6.0	5.3	4.7
	30	0.346	-	17.1	14.7	12.9	10.3	8.6	7.3	6.4	5.7
	40	0.400	-	19.8	17.0	14.9	11.9	9.9	8.5	7.4	6.6
	50	0.447	-	22.1	19.0	16.6	13.3	11.1	9.5	8.3	7.4
	60	0.490	-	24.2	20.8	18.2	14.5	12.1	10.4	9.1	8.1
	70	0.529	-	26.2	22.5	19.6	15.7	13.1	11.2	9.8	8.7
			<b>COLORTIP</b>	372014 (6 pcs. 750683)				<b>SINGLE</b> 372005 (6 pcs. 750674)			

<b>05-Brown</b>	20	0.354	-	17.5	15.0	13.1	10.5	8.8	7.5	6.6	5.8
	30	0.433	-	21.4	18.4	16.1	12.9	10.7	9.2	8.0	7.1
	40	0.500	-	24.8	21.2	18.6	14.9	12.4	10.6	9.3	8.3
	50	0.559	-	27.7	23.7	20.8	16.6	13.8	11.9	10.4	9.2
	60	0.612	-	30.3	26.0	22.7	18.2	15.2	13.0	11.4	10.1
	70	0.661	-	32.7	28.1	24.6	19.6	16.4	14.0	12.3	10.9
			<b>COLORTIP</b>	372015 (6 pcs. 750684)				<b>SINGLE</b> 372006 (6 pcs. 750675)			

	PSI	GPM	GPA at MPH								
			6	7	8	10	12	14	16	18	
<b>06-Grey</b>	20	0.424	-	21.0	18.0	15.8	12.6	10.5	9.0	7.9	7.0
	30	0.520	-	25.7	22.0	19.3	15.4	12.9	11.0	9.6	8.6
	40	0.600	-	29.7	25.5	22.3	17.8	14.9	12.7	11.1	9.9
	50	0.671	-	33.2	28.5	24.9	19.9	16.6	14.2	12.5	11.1
	60	0.735	-	36.4	31.2	27.3	21.8	18.2	15.6	13.6	12.1
	70	0.794	-	39.3	33.7	29.5	23.6	19.6	16.8	14.7	13.1
			<b>COLORTIP</b>	372016 (6 pcs. 750685)				<b>SINGLE</b> 372007 (6 pcs. 750676)			

<b>08-White</b>	20	0.566	-	28.0	24.0	21.0	16.8	14.0	12.0	10.5	9.3
	30	0.693	-	34.3	29.4	25.7	20.6	17.1	14.7	12.9	11.4
	40	0.800	-	39.6	33.9	29.7	23.8	19.8	17.0	14.9	13.2
	50	0.894	-	44.3	37.9	33.2	26.6	22.1	19.0	16.6	14.8
	60	0.980	-	48.5	41.6	36.4	29.1	24.2	20.8	18.2	16.2
	70	1.058	-	52.4	44.9	39.3	31.4	26.2	22.5	19.6	17.5
			<b>COLORTIP</b>	372017 (6 pcs. 750686)				<b>SINGLE</b> 372008 (6 pcs. 750677)			

<b>10-Light blue</b>	20	0.707	-	35.0	30.0	26.3	21.0	17.5	15.0	13.1	11.7
	30	0.866	-	42.9	36.7	32.2	25.7	21.4	18.4	16.1	14.3
	40	1.000	-	49.5	42.4	37.1	29.7	24.8	21.2	18.6	16.5
	50	1.118	-	55.3	47.4	41.5	33.2	27.7	23.7	20.8	18.4
	60	1.225	-	60.6	52.0	45.5	36.4	30.3	26.0	22.7	20.2
	70	1.323	-	65.5	56.1	49.1	39.3	32.7	28.1	24.6	21.8
			<b>COLORTIP</b>	372018 (6 pcs. 750687)				<b>SINGLE</b> 372009 (6 pcs. 750678)			

<b>15-Light green</b>	20	1.061	-	52.5	45.0	39.4	31.5	26.3	22.5	19.7	17.5
	30	1.299	-	64.3	55.1	48.2	38.6	32.2	27.6	24.1	21.4
	40	1.500	-	74.3	63.6	55.7	44.6	37.1	31.8	27.8	24.8
	50	1.677	-	83.0	71.2	62.3	49.8	41.5	35.6	31.1	27.7
	60	1.837	-	90.9	78.0	68.2	54.6	45.5	39.0	34.1	30.3
	70	1.984	-	98.2	84.2	73.7	58.9	49.1	42.1	36.8	32.7
			<b>COLORTIP</b>	372019 (6 pcs. 750688)				<b>SINGLE</b> 372010 (6 pcs. 750679)			

**NOTE:** Remember to adjust the pressure according to the density of the liquid fertilizer. See page 10.



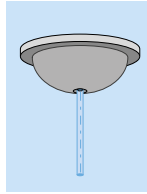
## Liquid fertilizer

### 1553 Solid stream nozzle

HARDI 1553 Cone nozzles are used without swirl plates for solid stream for solid stream (with swirl plates for hollow cone and full cone spraying - please see page 23). Use the solid stream for liquid fertilizer on boom sprayers.



- For application of liquid fertilizer at 10" nozzle spacing, with a minimum risk of scorching
- Flow rates from 0.077 – 8.27 GPM (at 15 –360 PSI)
- SYNTAL – precision moulded thermoplastic: precise, resistant and durable



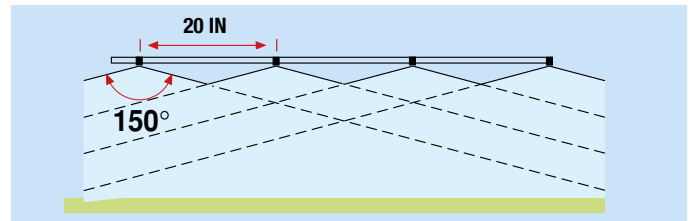
PSI	1553-8	-10	-12	-14	-16	GPM	-20	-22	-24	-30	-35	-40
15	0.077	0.115	0.171	0.224	0.305	0.367	0.489	0.588	0.682	1.047	1.386	1.688
20	0.089	0.133	0.197	0.259	0.352	0.423	0.565	0.678	0.787	1.209	1.600	1.949
30	0.109	0.163	0.241	0.317	0.431	0.518	0.692	0.831	0.964	1.480	1.960	2.387
50	0.140	0.210	0.312	0.409	0.557	0.669	0.893	1.073	1.245	1.911	2.530	3.081
70	0.166	0.249	0.369	0.484	0.659	0.792	1.056	1.269	1.473	2.261	2.993	3.646
90	0.188	0.282	0.418	0.549	0.747	0.898	1.198	1.439	1.670	2.564	3.394	4.134
150	0.243	0.364	0.540	0.708	0.964	1.159	1.546	1.858	2.156	3.310	4.382	5.336
220	0.294	0.441	0.654	0.858	1.168	1.404	1.873	2.250	2.611	4.009	5.307	6.463
360	0.376	0.564	0.836	1.097	1.494	1.796	2.396	2.879	3.340	5.128	6.788	8.267
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 40"



PSI	GPM	GPA at MPH								
		5	6	7	8	9	10	12	14	16
20	0.262	15.5	13.0	11.1	9.7	8.6	7.8	6.5	5.6	4.9
25	0.293	17.4	14.5	12.4	10.9	9.7	8.7	7.2	6.2	5.4
30	0.321	19.0	15.9	13.6	11.9	10.6	9.5	7.9	6.8	5.9
40	0.370	22.0	18.3	15.7	13.7	12.2	11.0	9.2	7.9	6.9
50	0.414	24.6	20.5	17.6	15.4	13.7	12.3	10.2	8.8	7.7
70	0.490	29.1	24.2	20.8	18.2	16.2	14.5	12.1	10.4	9.1
Large drop flat spray nozzle (371551) + 1553-14 Grey (370042)										

PSI	GPM	GPA at MPH								
		5	6	7	8	9	10	12	14	16
20	0.577	34.3	28.5	24.5	21.4	19.0	17.1	14.3	12.2	10.7
25	0.645	38.3	31.9	27.4	23.9	21.3	19.1	16.0	13.7	12.0
30	0.706	41.9	35.0	30.0	26.2	23.3	21.0	17.5	15.0	13.1
40	0.815	48.4	40.4	34.6	30.3	26.9	24.2	20.2	17.3	15.1
50	0.912	54.2	45.1	38.7	33.8	30.1	27.1	22.6	19.3	16.9
70	1.079	64.1	53.4	45.8	40.0	35.6	32.0	26.7	22.9	20.0
Large drop flat spray nozzle (371551) + 1553-20 Grey (370075)										

PSI	GPM	GPA at MPH								
		5	6	7	8	9	10	12	14	16
20	0.358	21.3	17.7	15.2	13.3	11.8	10.6	8.9	7.6	6.6
25	0.400	23.8	19.8	17.0	14.9	13.2	11.9	9.9	8.5	7.4
30	0.439	26.0	21.7	18.6	16.3	14.5	13.0	10.9	9.3	8.1
40	0.506	30.1	25.1	21.5	18.8	16.7	15.0	12.5	10.7	9.4
50	0.566	33.6	28.0	24.0	21.0	18.7	16.8	14.0	12.0	10.5
70	0.670	39.8	33.2	28.4	24.9	22.1	19.9	16.6	14.2	12.4
Large drop flat spray nozzle (371551) + 1553-16 Grey (370053)										

PSI	GPM	GPA at MPH								
		5	6	7	8	9	10	12	14	16
20	0.691	41.0	34.2	29.3	25.6	22.8	20.5	17.1	14.7	12.8
25	0.772	45.9	38.2	32.8	28.7	25.5	22.9	19.1	16.4	14.3
30	0.846	50.2	41.9	35.9	31.4	27.9	25.1	20.9	17.9	15.7
40	0.977	58.0	48.4	41.4	36.3	32.2	29.0	24.2	20.7	18.1
50	1.092	64.9	54.1	46.3	40.5	36.0	32.4	27.0	23.2	20.3
70	1.292	76.8	64.0	54.8	48.0	42.6	38.4	32.0	27.4	24.0
Large drop flat spray nozzle (371551) + 1553-22 Grey (370086)										

PSI	GPM	GPA at MPH								
		5	6	7	8	9	10	12	14	16
20	0.429	25.5	21.3	18.2	15.9	14.2	12.8	10.6	9.1	8.0
25	0.480	28.5	23.8	20.4	17.8	15.8	14.3	11.9	10.2	8.9
30	0.526	31.2	26.0	22.3	19.5	17.4	15.6	13.0	11.2	9.8
40	0.607	36.1	30.1	25.8	22.5	20.0	18.0	15.0	12.9	11.3
50	0.679	40.3	33.6	28.8	25.2	22.4	20.2	16.8	14.4	12.6
70	0.803	47.7	39.8	34.1	29.8	26.5	23.9	19.9	17.0	14.9
Large drop flat spray nozzle (371551) + 1553-18 Grey (370064)										

PSI	GPM	GPA at MPH								
		5	6	7	8	9	10	12	14	16
20	0.807	47.9	40.0	34.2	30.0	26.6	24.0	20.0	17.1	15.0
25	0.902	53.6	44.7	38.3	33.5	29.8	26.8	22.3	19.1	16.8
30	0.989	58.7	48.9	41.9	36.7	32.6	29.4	24.5	21.0	18.3
40	1.141	67.8	56.5	48.4	42.4	37.7	33.9	28.3	24.2	21.2
50	1.276	75.8	63.2	54.1	47.4	42.1	37.9	31.6	27.1	23.7
70	1.510	89.7	74.7	64.1	56.1	49.8	44.8	37.4	32.0	28.0
Large drop flat spray nozzle (371551) + 1553-24 Grey (370097)										

**NOTE:** Remember to adjust the pressure according to the density of the liquid fertilizer. See page 10.



# Calibration of mistblowers

## Calibration of forward speed

See page 9: Calibration of field sprayers (note that the tractor PTO should be 540 rpm, which will allow the blower to operate at its maximum capacity)

## 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 with the following formula (based on driving in each row):

$$\frac{\text{Row spacing (ft)} \times \text{GPA} \times \text{MPH}}{495} = \text{total GPM}$$

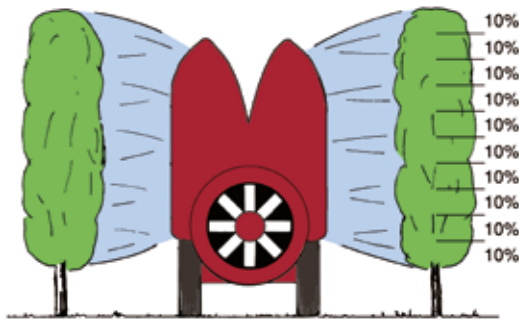
**Example** Row spacing: 18 ft  
Application rate: 40 GPA  
Forward speed: 3 MPH

$$\frac{18 \text{ ft} \times 40 \text{ GPA} \times 3 \text{ MPH}}{495} = 4.36 \text{ GPM}$$

The total nozzle capacity is 4.36 GPM. This amount has to be divided between all the nozzles on the mistblower. Two examples are described in the following:

### (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 10 nozzles is the same. This is calculated as follows:



$$\frac{\text{Total GPM}}{\text{Number of nozzles}} = \text{capacity of single nozzle in GPM}$$

**Example**  
 $\frac{4.36 \text{ GPM}}{10 \text{ nozzles}} = 0.44 \text{ GPM}$

In the 1299 nozzle chart you will find the nozzle closest to the desired output at a suitable pressure – Red nozzle at 110 PSI has a capacity of 0.45 GPM.

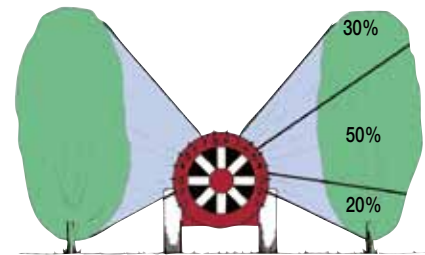
We recommend that you double-check the nozzle output with a measuring jug (with clean water in the

sprayer). You can do this by disconnecting the blower and directing the water into the jug, using a hose. If exactly 0.44 GPM is desired, the pressure can be adjusted with the pressure adjustment formula:

$$\left( \frac{\text{New output (GPM)}}{\text{Known output (GPM)}} \right)^2 \times \text{Known pressure (PSI)} = \text{New pressure (PSI)}$$

**Example**  
 $\left( \frac{0.44 \text{ GPM}}{0.45 \text{ GPM}} \right)^2 \times 110 \text{ PSI} = 105 \text{ PSI}$

### (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 18 ft, forward speed of 3 MPH and desired application rate of 40 GPA.

In this case nozzles 1 and 8 are shut off  
2 and 3 apply 20 % = 0.44 GPM (each nozzle applies 0.22 GPM)  
4 and 5 apply 50 % = 1.09 GPM (each nozzle applies 0.54 GPM)  
6 and 7 apply 30 % = 0.65 GPM (each nozzle applies 0.33 GPM)

Chosen from the flow table on page 23 giving the following combination at 110 PSI:

Nozzle 2 and 3: 1299-14 orange (0.24 GPM)  
Nozzle 4 and 5: 1299-18 green (0.58 GPM)  
Nozzle 6 and 7: 1299-12 yellow (0.32 GPM)  
These do not correspond exactly with the desired, as the total capacity would be 4.56 GPM instead of 4.36 GPM. The correct pressure can be calculated with the pressure correction formula at 101 PSI.

$$\left( \frac{4.36 \text{ GPM}}{4.56 \text{ GPM}} \right)^2 \times 110 \text{ PSI} = 101 \text{ PSI}$$

Use the HARDI® calibration disk (order No: 285546) for easy nozzle selection and calibration.



## 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 vineyard and orchard mistblower applications at high working pressure or when applying abrasive materials.

- High efficiency nozzles
- Best choice for orchard applications
- Flow rates from 0.05 to 1.14 GPM (at 40 – 220 PSI)
- Working pressure from 40 - 220 PSI
- CERAMIC – superior durability at high working pressure

Useful on droplets 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.

PSI		GPM
1299-06 White 371507		
40	VF	0.054
70	VF	0.070
90	VF	0.079
120	VF	0.090
140	VF	0.096
220	VF	0.119

PSI		GPM
1299-12 Yellow 371510		
40	F	0.141
70	VF	0.182
90	VF	0.204
120	VF	0.233
140	VF	0.250
220	VF	0.308

PSI		GPM
1299-17 Grey 371972		
40	F	0.301
70	F	0.390
90	F	0.438
120	F	0.500
140	VF	0.536
220	VF	0.660

PSI		GPM
1299-08 Lilac 371508		
40	VF	0.072
70	VF	0.093
90	VF	0.104
120	VF	0.119
140	VF	0.128
220	VF	0.157

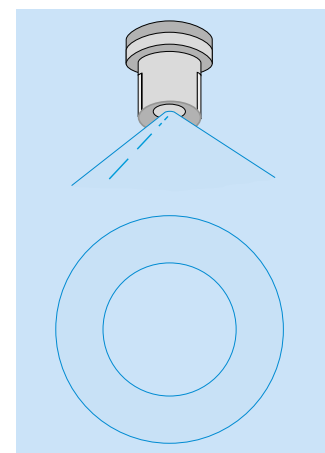
PSI		GPM
1299-14 Orange 371511		
40	F	0.188
70	VF	0.243
90	VF	0.273
120	VF	0.311
140	VF	0.334
220	VF	0.412

PSI		GPM
1299-18 Green 371513		
40	F	0.353
70	F	0.456
90	F	0.512
120	F	0.584
140	VF	0.627
220	VF	0.772

PSI		GPM
1299-10 Brown 371509		
40	VF	0.094
70	VF	0.121
90	VF	0.136
120	VF	0.155
140	VF	0.166
220	VF	0.205

PSI		GPM
1299-16 Red 371512		
40	F	0.274
70	F	0.355
90	F	0.399
120	VF	0.455
140	VF	0.488
220	VF	0.601

PSI		GPM
1299-19 Black 371973		
40	F	0.402
70	F	0.520
90	F	0.584
120	F	0.666
140	F	0.715
220	VF	0.881



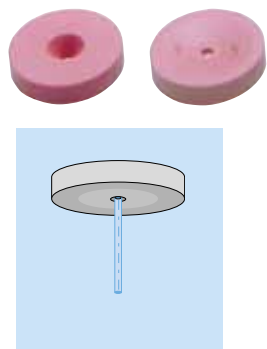
PSI		GPM
1299-20 Blue 371514		
40	M	0.518
70	M	0.670
90	F	0.752
120	F	0.859
140	F	0.922
220	F	1.135

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

### 1099 Solid stream nozzles - 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								
PSI	GPM															
30	0.15	0.12	0.25	0.17	0.31	0.25	0.51	0.38	0.68	0.53	0.83	0.66	1.07	0.85	1.73	1.39
70	0.22	0.18	0.36	0.26	0.46	0.38	0.75	0.58	1.05	0.81	1.26	1.02	1.66	1.31	2.72	2.19
100	0.25	0.21	0.42	0.31	0.55	0.46	0.88	0.69	1.25	0.97	1.50	1.22	2.00	1.56	3.30	2.66
150	0.31	0.26	0.51	0.38	0.67	0.56	1.07	0.85	1.53	1.19	1.84	1.50	2.46	1.91	4.07	3.29
200	0.35	0.30	0.58	0.44	0.78	0.64	1.23	0.98	1.77	1.37	2.12	1.74	2.85	2.21	4.72	3.82
300	0.43	0.36	0.70	0.54	0.95	0.78	1.48	1.19	2.17	1.68	2.59	2.14	3.53	2.70	5.88	4.76
450	0.52	0.44	0.83	0.66	1.15	0.96	1.79	1.46	2.65	2.06	3.17	2.63	4.35	3.31	7.29	5.91
700	0.63	0.54	1.02	0.81	1.43	1.19	2.19	1.81	3.31	2.57	3.94	3.29	5.48	4.13	9.24	7.50
No	371309		371310		371311		371312		371313		371314		371315		371884	



# 1553 cone nozzles

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 (see page 20).

## Drop sizes

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



## Large drop adaptor

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

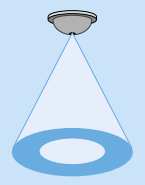


This adaptor changes the droplet spectrum to very large (VL) droplets.

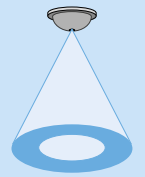


Drop Nozzle:  
83428103 Box of 5pcs  
83427803 1pcs

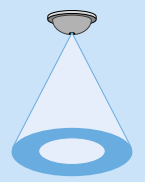
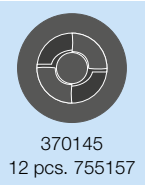
1553	-8	-10	-12	-14	-16	-18	-20	-22	-24	-30	-35	-40
<b>PSI</b>	<b>GPM</b>											
30	0.06	0.08	0.09	0.10	0.12	0.13	0.14	0.15	0.16	0.19	0.21	0.23
35	0.06	0.08	0.10	0.11	0.13	0.14	0.15	0.17	0.18	0.21	0.22	0.25
40	0.07	0.09	0.10	0.12	0.14	0.15	0.17	0.18	0.19	0.22	0.24	0.27
50	0.08	0.10	0.12	0.13	0.15	0.17	0.18	0.20	0.21	0.25	0.27	0.30
60	0.08	0.11	0.13	0.15	0.17	0.19	0.20	0.22	0.23	0.27	0.29	0.33
70	0.09	0.11	0.14	0.16	0.18	0.20	0.22	0.23	0.25	0.29	0.32	0.35
90	0.10	0.13	0.16	0.18	0.21	0.23	0.25	0.27	0.28	0.33	0.36	0.40
120	0.12	0.15	0.18	0.21	0.24	0.26	0.29	0.31	0.33	0.38	0.42	0.46
150	0.13	0.17	0.20	0.23	0.27	0.29	0.32	0.34	0.37	0.43	0.46	0.52
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



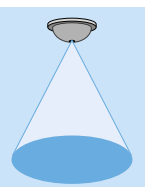
1553	-8	-10	-12	-14	-16	-18	-20	-22	-24	-30	-35	-40
<b>PSI</b>	<b>GPM</b>											
30	0.11	0.13	0.18	0.22	0.26	0.30	0.34	0.38	0.41	0.52	0.60	0.67
35	0.11	0.15	0.19	0.23	0.28	0.32	0.37	0.41	0.44	0.57	0.65	0.73
40	0.12	0.16	0.20	0.25	0.30	0.34	0.39	0.43	0.47	0.61	0.70	0.78
50	0.14	0.17	0.23	0.28	0.33	0.38	0.44	0.49	0.53	0.68	0.78	0.87
60	0.15	0.19	0.25	0.30	0.36	0.42	0.48	0.53	0.58	0.74	0.85	0.95
70	0.16	0.21	0.27	0.33	0.39	0.45	0.52	0.57	0.63	0.80	0.92	1.03
90	0.18	0.23	0.31	0.37	0.45	0.51	0.59	0.65	0.71	0.91	1.04	1.17
120	0.21	0.27	0.35	0.43	0.52	0.59	0.68	0.75	0.82	1.05	1.20	1.35
150	0.24	0.30	0.39	0.48	0.58	0.66	0.76	0.84	0.92	1.17	1.35	1.51
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



1553	-8	-10	-12	-14	-16	-18	-20	-22	-24	-30	-35	-40
<b>PSI</b>	<b>GPM</b>											
30	0.10	0.14	0.19	0.23	0.28	0.33	0.37	0.42	0.47	0.60	0.69	0.77
35	0.11	0.15	0.20	0.25	0.31	0.35	0.40	0.45	0.51	0.65	0.74	0.84
40	0.12	0.16	0.22	0.27	0.33	0.38	0.43	0.48	0.54	0.70	0.79	0.89
50	0.14	0.18	0.24	0.30	0.37	0.42	0.48	0.54	0.61	0.78	0.89	1.00
60	0.15	0.20	0.27	0.33	0.40	0.46	0.53	0.59	0.66	0.85	0.97	1.10
70	0.16	0.21	0.29	0.35	0.43	0.50	0.57	0.64	0.72	0.92	1.05	1.18
90	0.18	0.24	0.33	0.40	0.49	0.57	0.65	0.72	0.81	1.04	1.19	1.34
120	0.21	0.28	0.38	0.46	0.57	0.65	0.75	0.83	0.94	1.20	1.37	1.55
150	0.23	0.31	0.42	0.52	0.64	0.73	0.83	0.93	1.05	1.35	1.53	1.73
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



1553	-8	-10	-12	-14	-16	-18	-20	-22	-24	-30
<b>PSI</b>	<b>GPM</b>									
30	0.11	0.17	0.25	0.33	0.44	0.52	0.69	0.74	0.83	0.92
35	0.12	0.18	0.27	0.36	0.48	0.56	0.74	0.80	0.90	0.99
40	0.13	0.19	0.29	0.38	0.51	0.60	0.80	0.86	0.96	1.06
50	0.14	0.22	0.33	0.43	0.57	0.67	0.89	0.96	1.07	1.19
60	0.16	0.24	0.36	0.47	0.63	0.74	0.97	1.05	1.18	1.30
70	0.17	0.26	0.39	0.51	0.68	0.80	1.05	1.13	1.27	1.40
90	0.19	0.29	0.44	0.57	0.77	0.90	1.19	1.29	1.44	1.59
120	0.22	0.33	0.51	0.66	0.89	1.04	1.38	1.48	1.66	1.84
150	0.25	0.37	0.56	0.74	0.99	1.17	1.54	1.66	1.86	2.05
No.	370016	370027	370031	370042	370053	370064	370075	370086	370097	370101
12 pcs.	750256	755031	755382	755064	755385	755065	755097	755066	755123	750257



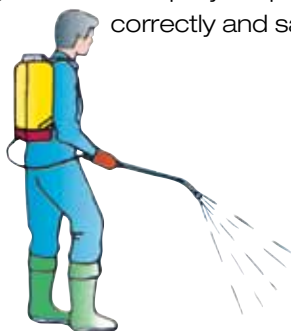
## Calibration of hand operated sprayers

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 1000 sq.ft.

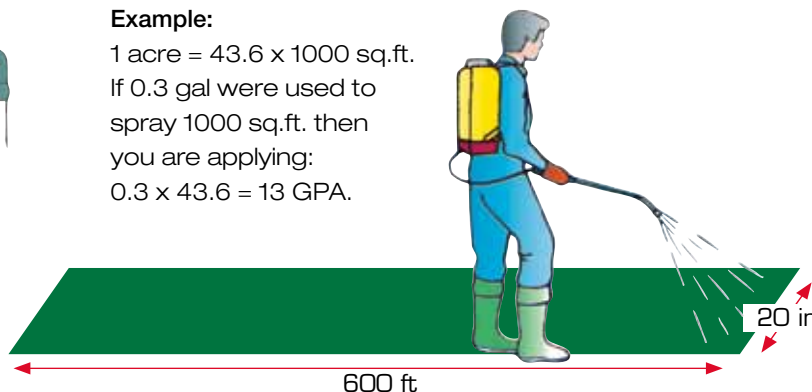
Swath width inch	Spraying distance ft.
20	600
27	444
40	300
47	255
75	160

- 7** To find application rate (GPA), multiply the amount of spray missing in the tank by 43.6. (Measure when refilling).



**Example:**

1 acre = 43.6 x 1000 sq.ft.  
 If 0.3 gal were used to spray 1000 sq.ft. then you are applying:  
 $0.3 \times 43.6 = 13 \text{ GPA}$ .





# Nozzles for hand operated sprayers

## HC - Hollow cone nozzles - SYNTAL



- Very wide spray angle
- One piece construction
- SYNTAL



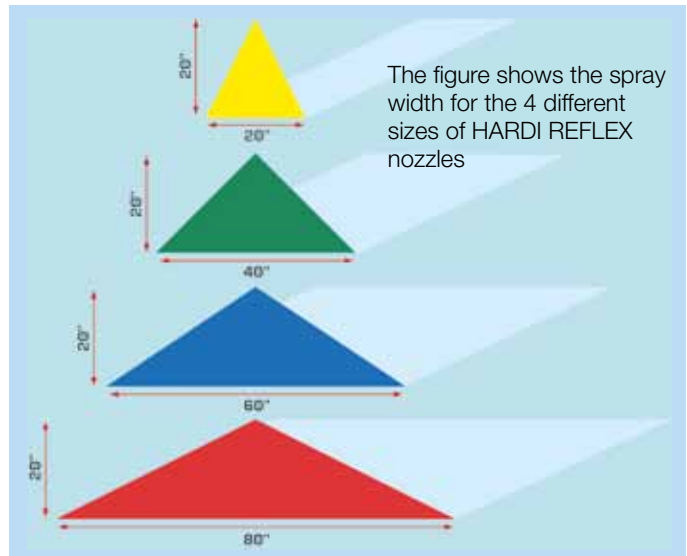
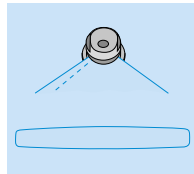
	Yellow	Grey
PSI	GPM	
20	0.143	0.430
25	0.160	0.481
30	0.176	0.527
40	0.203	0.608
50	0.227	0.680
70	0.268	0.804
No.	371694	371696

This nozzle is designed for backpack sprayers. The restrictor and the nozzle are fixed together to avoid losing parts when taken apart for cleaning.

## HARDI REFLEX nozzles - SYNTAL



- Spray width from 20" to 80"
- Even distribution across the swath
- 20 GPA at 15 PSI



These nozzles are designed so the application volume is the same for all sizes at 15 PSI and a normal walking speed (2.2mph), only the spray width changes.

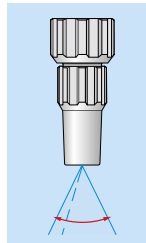


	Yellow	Green	Blue	Red
PSI	GPM			
15	0.16	0.32	0.48	0.64
No.	372020	372021	372022	372023

## Adjustable nozzles - SYNTAL



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



No. 755835			
	GPM		Spray angle
20	0,18	0,33	80°
30	0,19	0,37	85°
40	0,23	0,44	90°
60	0,25	0,49	90°
70	0,29	0,58	95°

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



## 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 9 – calibration of field sprayers

#### 2 GPA in band

Label recommendations usually state total GPA 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: GPA in band.

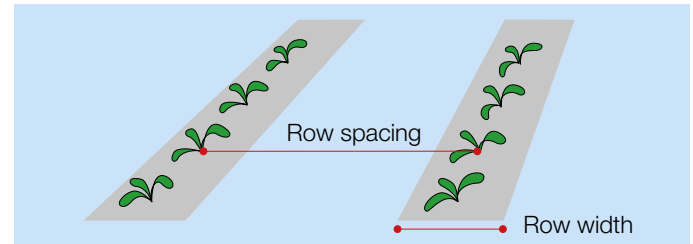
#### 3 Calculation of nozzle capacity

$$\frac{\text{GPA in band} \times \text{band width (inch)} \times \text{MPH}}{5940} = \text{GPM per band}$$

If 20 GPA is to be applied at 3 MPH in a 10" wide band, the necessary output will be: 0.1 GPM/per band. If, for instance, 1 nozzle per band is used, every nozzle should apply 0.1 GPM. Nozzles and pressures can then be found in the relevant tables.

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

$$\frac{\text{area of field (acre)} \times \text{gpm in band} \times \text{band width (inch)}}{\text{row spacing (inch)}} = \text{spray mix (total gal/field)}$$



If the row spacing is 30"; band width 10"; field 10 acres; and GPA in band = 20 GPA – the total required volume will be:

$$\frac{10 \times 20 \times 10}{100} = 66.7 \text{ gal.}$$

#### 5 Calculation of amount of chemical per tank

$$\frac{\text{gallons of water in tank} \times \text{chemical dose desired (GPA)}}{\text{GPA in band}} = \text{litres of chemical per tank}$$

If the tank holds 500 gallons, and 2 gallons of chemical products are required per acre when 20 GPA in band is applied, the following calculation should be used:

$$\frac{500 \times 2}{20} = 50 \text{ gallons chemical product per tank}$$

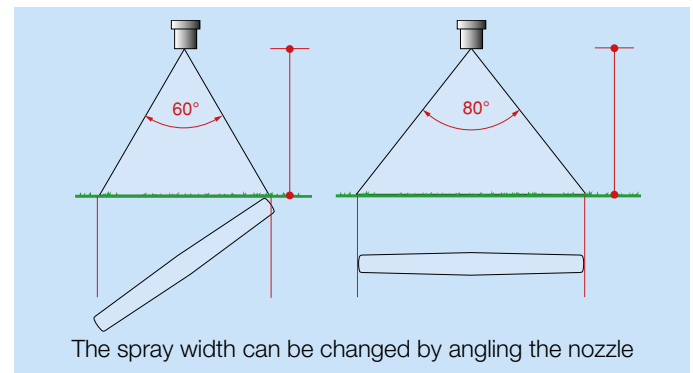
## HARDI Even spray nozzles

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



- Even distribution is ideal for band spraying
- Use the 4680E on hand operated sprayers, when only one nozzle is used
- Application range: 0.06 to 1.44 GPM
- Pressure range 20 – 70 PSI

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
PSI	GPM								
20	0.06	0.08	0.11	0.15	0.21	0.31	0.38	0.47	0.77
25	0.06	0.09	0.12	0.17	0.23	0.35	0.43	0.53	0.86
30	0.07	0.09	0.13	0.19	0.25	0.38	0.47	0.58	0.94
40	0.08	0.11	0.15	0.22	0.29	0.44	0.54	0.67	1.09
50	0.09	0.12	0.17	0.24	0.33	0.49	0.61	0.74	1.22
70	0.10	0.14	0.20	0.29	0.39	0.58	0.72	0.88	1.44
No.	371576	371577	371578	371579	371580	371581	371582	371583	371585

## End nozzles

Off center 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 nozzles 3/8" – SYNTAL



- Off-centre spray nozzle
- 3/8"
- Pressure range: 30 to 90 PSI
- Spray width up to 136"
- SYNTAL precision moulded thermoplastic

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

### 1740

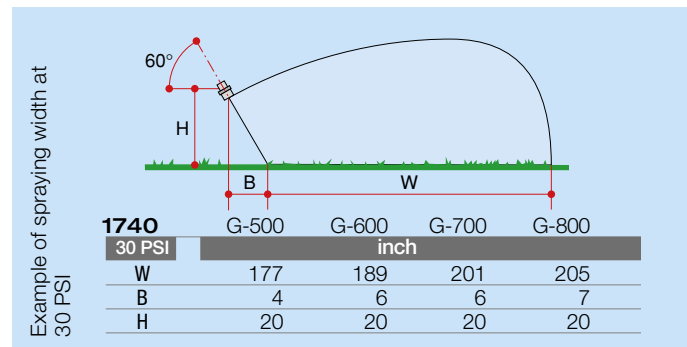
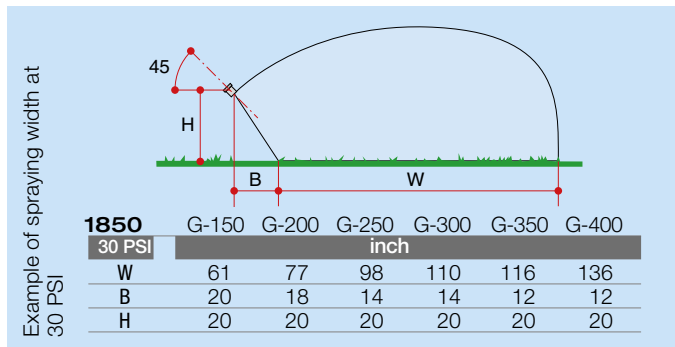
#### End nozzles 1/2" – SYNTAL



- Off-centre spray nozzle
- 1/2"
- Pressure range: 30 to 90 PSI
- Spray width up to 205"
- SYNTAL precision moulded thermoplastic

This nozzle is mounted on the end of the

boom tube using the 72023300 mounting kit.



1850	GPM					
	G-150	G-200	G-250	G-300	G-350	G-400
30	0.224	0.366	0.634	0.792	1.209	1.665
45	0.274	0.449	0.777	0.970	1.480	2.039
60	0.316	0.518	0.897	1.120	1.709	2.355
75	0.354	0.579	1.002	1.252	1.911	2.633
90	0.388	0.635	1.098	1.372	2.094	2.884
No.	370366	370377	370381	370392	370403	370414

1740	GPM			
	G-500	G-600	G-700	G-800
30	2.095	2.418	2.848	3.332
45	2.566	2.961	3.488	4.081
60	2.963	3.419	4.027	4.713
75	3.313	3.823	4.502	5.269
90	3.629	4.187	4.932	5.772
No.	370425	370436	370447	370451

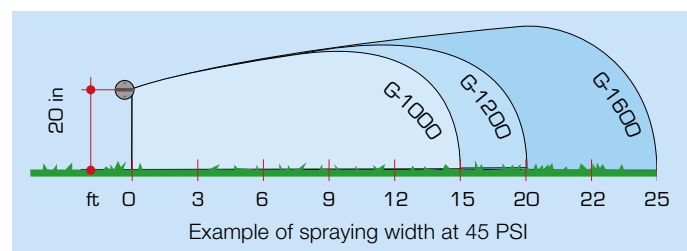
### G - Giant end nozzles – SYNTAL



- Off center spray nozzle
- Pressure range: 20 to 70 PSI
- Spray width up to 25 ft.
- SYNTAL precision moulded thermoplastic

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

PSI	GPM	
	G-1200 White	G-1600 Blue
20	3.762	5.015
30	4.607	6.143
40	5.320	7.093
50	5.948	7.930
70	7.037	9.383
No.	371557	371558



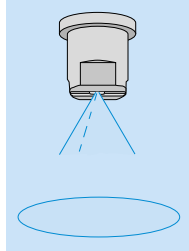
HARDI can supply a range of nozzles for special applications such as tank and container cleaning. If you do not find what you need in this product guide, please contact your HARDI dealer.

## 4665 65°

### Flat spray nozzles - SYNTAL



- Recommended pressure range: 20 - 70 PSI
- Recommended boom height above target: 25" to 30".
- SYNTAL



This nozzle provides an elliptical spray pattern (Flat Fan) 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.

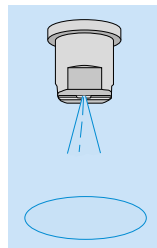
4665	4665-10	4665-12	4665-14	4665-16	4665-20	4665-24	4665-30
PSI	GPM						
20	0.08	0.12	0.16	0.21	0.28	0.37	0.53
25	0.09	0.13	0.18	0.24	0.31	0.42	0.59
30	0.10	0.15	0.20	0.26	0.34	0.46	0.64
40	0.12	0.17	0.23	0.30	0.40	0.53	0.74
50	0.13	0.19	0.26	0.34	0.44	0.59	0.83
70	0.16	0.22	0.30	0.40	0.53	0.70	0.99
No.	370285	370296	370307	370311	370322	370333	370344

## 4625 25°

### Flat spray nozzles - SYNTAL



- Pressure range: 35 - 350 PSI
- 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.

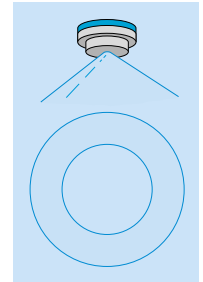
4625	4625-20	4625-24	4625-30	4625-36	4625-46	4625-54
PSI	GPM					
50	0.52	0.69	0.90	1.29	1.91	2.15
70	0.62	0.82	1.07	1.52	2.26	2.54
100	0.74	0.98	1.28	1.82	2.70	3.04
150	0.90	1.20	1.56	2.23	3.31	3.72
250	1.16	1.55	2.02	2.88	4.27	4.80
350	1.38	1.83	2.39	3.41	5.05	5.68
No.	370506	370517	370521	370532	370543	370544

## 5131

### Misting nozzles - SYNTAL



- Pressure range: 20 - 70 PSI
- Hollow Cone nozzle
- Very Fine (VF) 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.

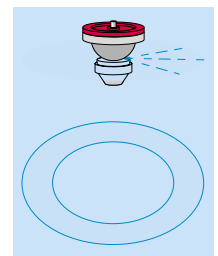
5131	5131
PSI	GPM
30	0.055
40	0.063
50	0.071
70	0.084
No.	370963

## 3600

### Deflector spray nozzles - SYNTAL



- Pressure range: 20 - 150 PSI
- 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 20 - 70 PSI. Useful for raising humidity in greenhouses etc.

3600	3600-30	3600-35	3600-40
PSI	GPM		
20	0.417	0.505	0.614
25	0.467	0.565	0.687
30	0.511	0.619	0.752
40	0.590	0.714	0.869
50	0.660	0.799	0.971
70	0.781	0.945	1.149
90	0.885	1.072	1.303
120	1.022	1.237	1.505
150	1.143	1.383	1.683
No.	703054	703065	703076

## Container rinsing nozzles - SYNTAL

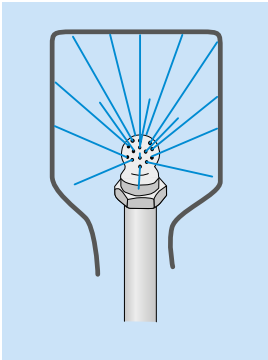


- Multi hole rinsing nozzle
- 40 solid streams
- Pressure range: 20 - 70 PSI
- Efficient container cleaning
- SYNTAL



- 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.



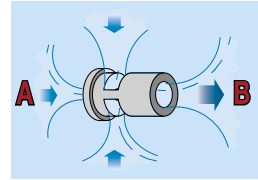
PSI	Multi hole	Rotary
	GPM	
20	3.55	-
30	4.35	-
45	5.33	-
60	6.16	-
75	6.88	-
No.	371552	72317300

## 5066

### Agitation nozzles - SYNTAL



- Pressure range: 15 - 225 PSI
- 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 chemicals-pesticides for example.

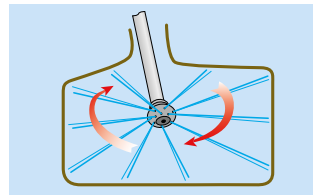
5066 PSI	5066-1.5		5066-2.0		5066-2.5		5066-3.0	
	GPM							
	A	B	A	B	A	B	A	B
15	0.32	1.98	0.49	2.45	0.82	3.15	1.37	4.07
22	0.39	2.39	0.60	2.97	0.99	3.82	1.66	4.92
30	0.46	2.79	0.70	3.47	1.16	4.46	1.93	5.75
45	0.56	3.42	0.85	4.25	1.42	5.46	2.37	7.04
75	0.72	4.42	1.10	5.48	1.83	7.05	3.06	9.09
90	0.79	4.84	1.21	6.00	2.00	7.73	3.35	9.96
150	1.02	6.25	1.56	7.75	2.59	9.97	4.33	12.86
225	1.25	7.65	1.91	9.49	3.17	12.21	5.30	15.75
No.	370462	370473	370484	370495				

## Tank cleaning nozzles



- 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 excellent rinsing of the entire inside surface of the sprayer tank.



Tank cleaning nozzle	
PSI	GPM
75	22
150	31
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, colors 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.

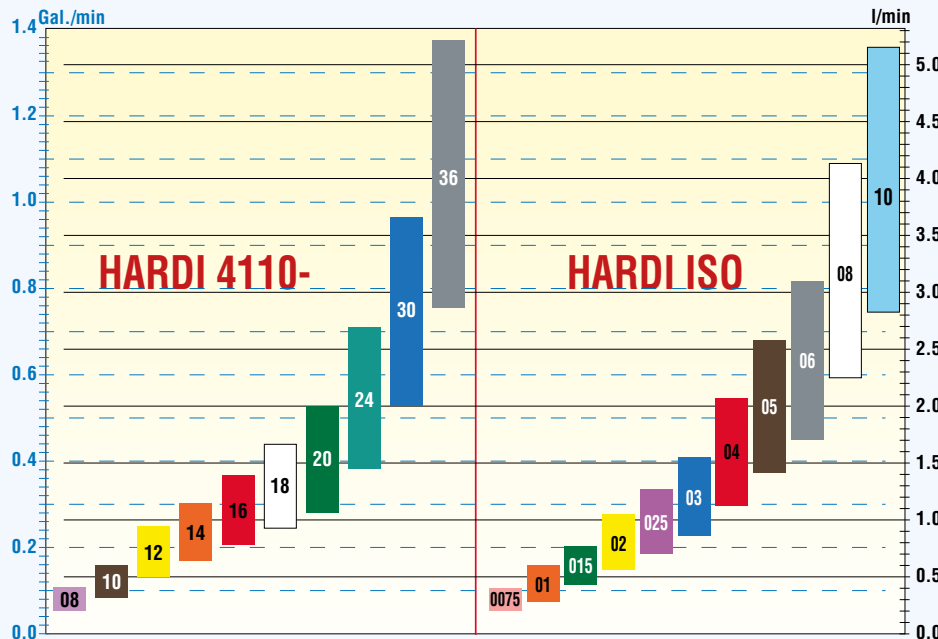


On sprayers with TeeJet or compatible systems use Single nozzles (S) and the 334862 black cap. The same cap is used for INJET and MINIDRIFT nozzles. (gasket: 242222).

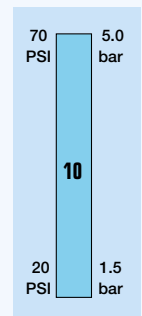


On all other systems use the ISO cap delivered with your sprayer together with Single nozzles (S) or INJET (INJET require a special 0.4" cap).

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



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




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 3 step (optional 4 step) process:


Filter size Mesh (*standard)	80	50	*30
	100	*80	(50)
	100	*80	50
	100	80	*50




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



**2** 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.



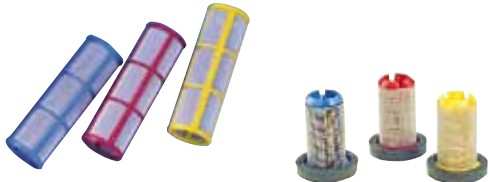
**3** In-line filters. These filters reduce nozzle filter blockages and make filter cleaning quicker.



**4** 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.



## Fittings

TRIPLET provides 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** Black TeeJet cap, (334862) (gasket: 242222)



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

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

Mesh	30	50	80	100
	in	0.033	0.020	0.013

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



NAVIGATOR



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