



HARDI® ISO NOZZLES

Nozzle product guide

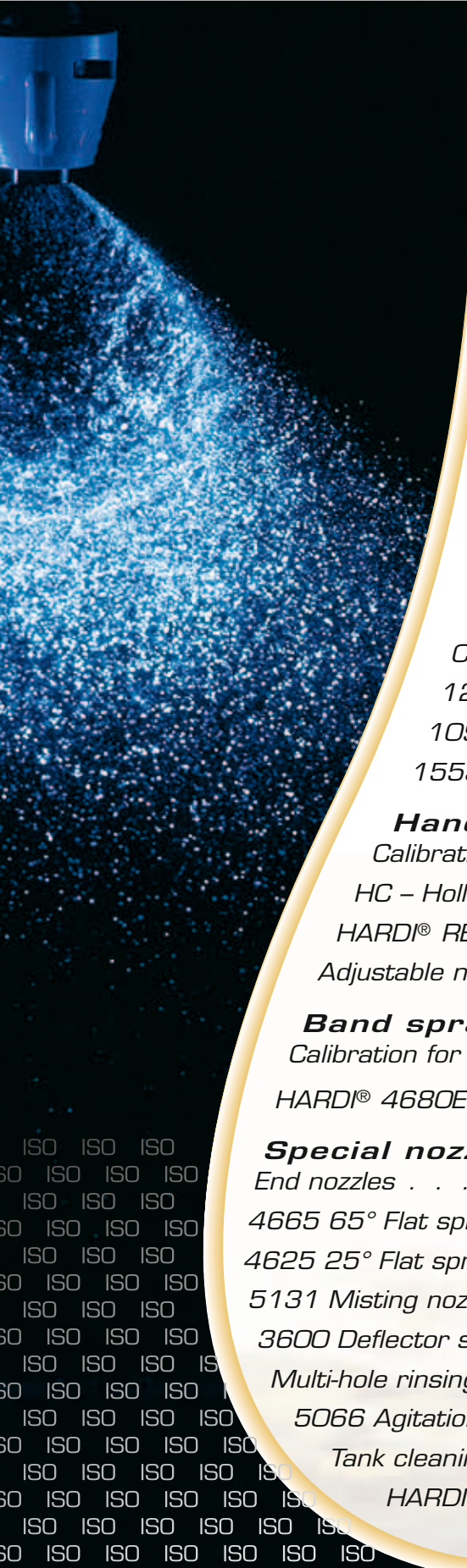


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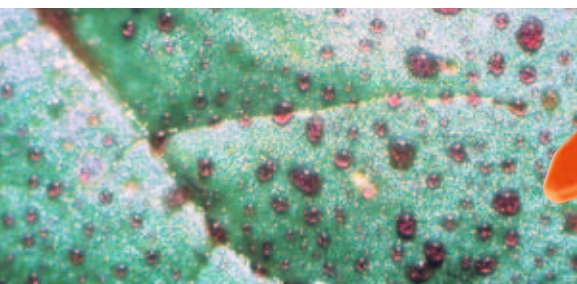
HARDI® nozzle supremacy

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 plant protecting product that it will apply.

The nozzle controls:

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



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

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

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

Quality in production ensures optimal field performance.



HARDI® quality nozzle production in Nørre Alslev, Denmark

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

Quality control includes not just laboratory measurements but the use of HARDI® nozzles in the field, under commercial conditions.

Every drop of spray needs to be both accounted for - and documented - in order to ensure the quality of food delivered onto the dining table, and it meets the demands of the public today.

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

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

HARDI® is a world leader in understanding the 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 programs for agriculture, horticulture [including most vegetables], viticulture as well as many more specialist needs. This nozzle guide will help you select the best nozzle for your needs, consider environmental aspects, and help you calibrate it for optimal use to ensure that you meet all of today's needs when using crop protection products.



HARDI INTERNATIONAL A/S Nørre Alslev





Nozzle technology

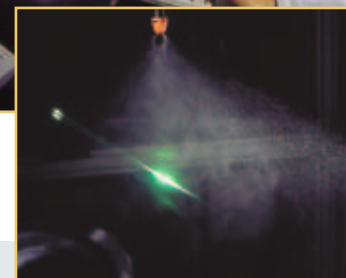
Fundamental research with nozzles by HARDI® agro-scientists is conducted in their own dedicated laboratories and those of independent research centers at many key institutions throughout the world. Sites where field research is conducted are very diverse - ranging from the temperate conditions of Northern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

Instrumentation used in HARDI®'s laboratories is at the leading edge in droplet size analysis studies.

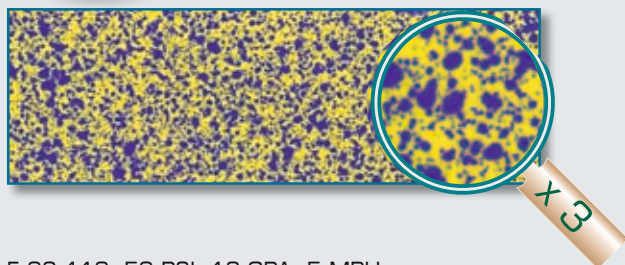
It is this broad, but intensive, approach combined with state of the art manufacturing techniques and computerized quality control programs, that guarantees HARDI® nozzles will meet the demands of better crop protection.

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.

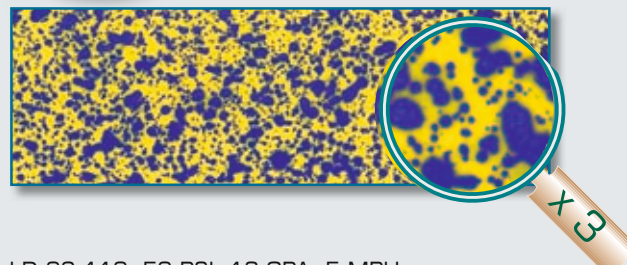


HARDI® Flat fan nozzles



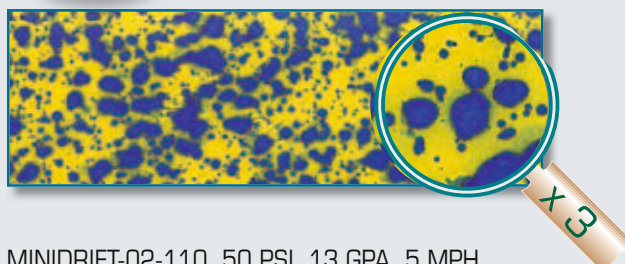
F-02-110 50 PSI 13 GPA 5 MPH

HARDI® LD LowDrift nozzles



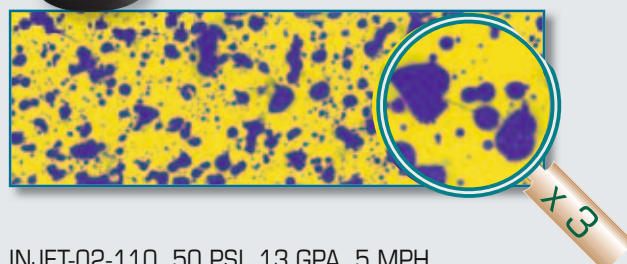
LD-02-110 50 PSI 13 GPA 5 MPH

HARDI® MINIDRIFT nozzles



MINIDRIFT-02-110 50 PSI 13 GPA 5 MPH

HARDI® INJET nozzles



INJET-02-110 50 PSI 13 GPA 5 MPH



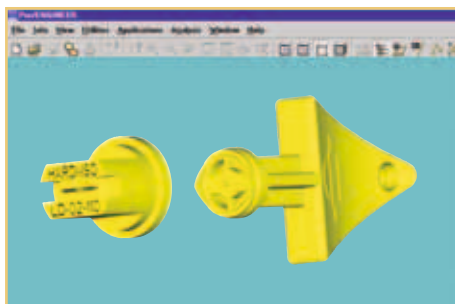
Nozzle technology

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, which have and will continue to take place at HARDI®.

This activity closely involves our agronomists, engineers and specialist tool makers. Farmer's needs are recognized and met

with HARDI® nozzles designed to provide the precision they demand 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.



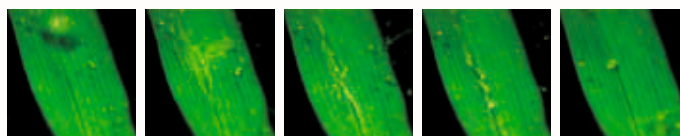
Wind Tunnel Studies

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.

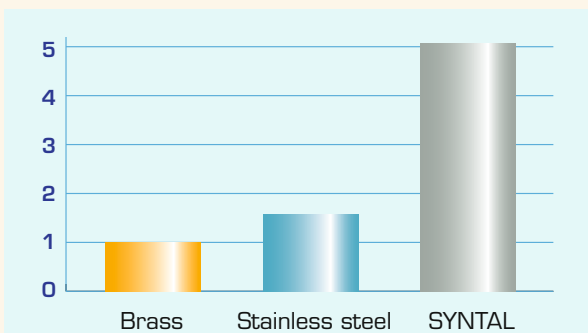
High Speed Video

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



High Quality Materials

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



(Kim Sintom, Swedish University).

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

Deposit tests

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

Efficacy trials

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



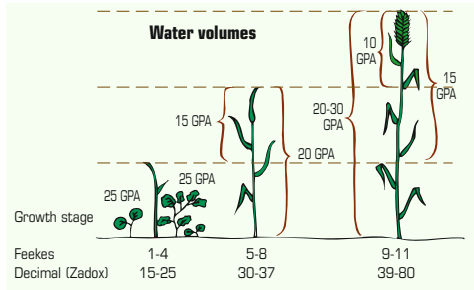


Choosing nozzles for arable crops

A nozzle for every spray job

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

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



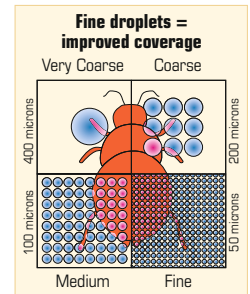
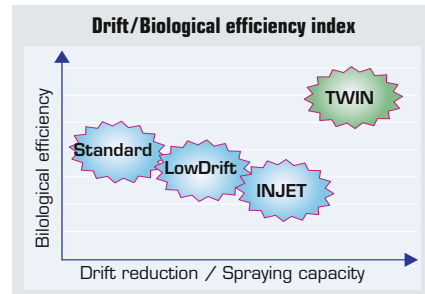
These small standard nozzles even when weather conditions are not optimal.

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.

Choosing nozzles

The tables below 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 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.



- Small dicot weeds need good coverage either through fine droplets or – if using a coarser spray – by compensating with a higher volume rate.
- For large dicot weeds – coarse 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 doses.
- When mixing products or using products with more than one mode of action adjust to the most demanding component of that product mix.

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

HARDI® ISO F-110 Standard flat fan nozzles							HARDI® ISO LD-110 LowDrift nozzles							HARDI® ISO MINIDRIFT Air inclusion nozzles							HARDI® ISO INJET Air inclusion nozzles						
ISO size/color	PSI 20	30	40	50	60	70	ISO size/color	PSI 20	30	40	50	60	70	ISO size/color	PSI 20	30	40	50	60	70	ISO size/color	PSI 40	60	70	80	100	120
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	015-Green	0.150	0.184	0.198	0.212	0.237	0.260
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	02-Yellow	0.200	0.245	0.265	0.283	0.316	0.346
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	025-Lilac	0.250	0.306	0.331	0.354	0.395	0.433
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	03-Blue	0.300	0.367	0.397	0.424	0.474	0.520
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	04-Red	0.400	0.490	0.529	0.566	0.632	0.693
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	05-Brown	0.500	0.612	0.661	0.707	0.791	0.866
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	06-Grey	0.600	0.735	0.794	0.849	0.949	1.039
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	08-White	0.800	0.980	1.058	1.131	1.265	1.366
06-Grey	0.424	0.520	0.600	0.671	0.735	0.794	10-Light blue	0.707	0.866	1.000	1.118	1.225	1.323	Spray quality: Fine (Blue) Coarse (Dark Blue) Medium (Yellow) Very coarse (Grey)													
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® nozzles on all liquid systems

HARDI® ISO nozzles fulfill 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 the fittings below, which allow you to adapt HARDI® ISO nozzles to your sprayer.

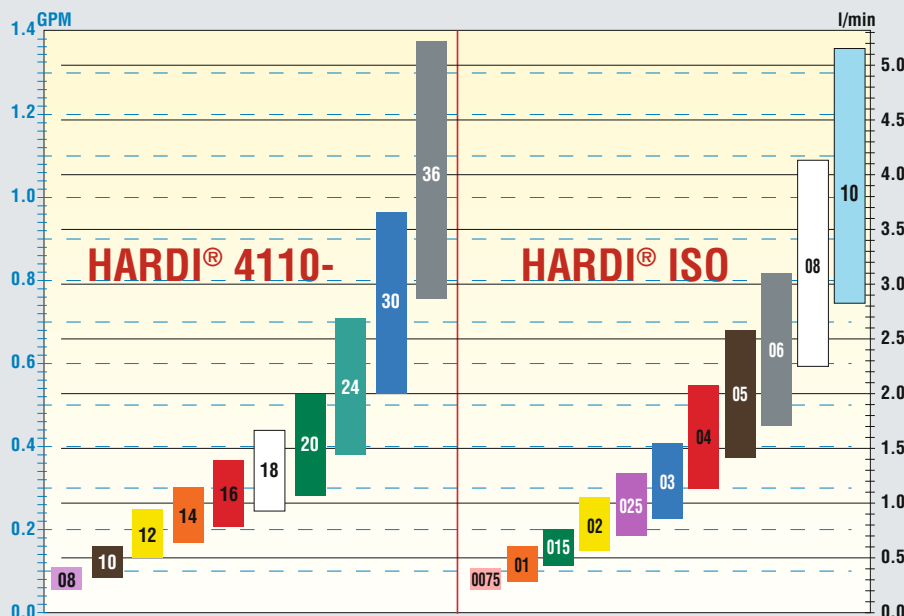


On sprayers with HARDI® SNAP-FIT systems, the HARDI® COLOR TIPS™ (CT) are recommended for safe and easy handling. For INJET™ nozzles use the 334083 black nozzle cap. HARDI® part 10423503 Nitril O-ring for HARDI® nozzles (Between Cap and Nozzle Body).

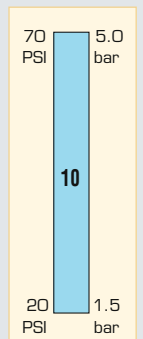
On sprayers with TeeJet or compatible systems, use Single nozzles (S) and the 334862 black cap. The same cap is used for INJET™ nozzles. (gasket: 242222).

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

Conversion table for old 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 the new HARDI® ISO nozzles that may replace your old 4110 nozzles.



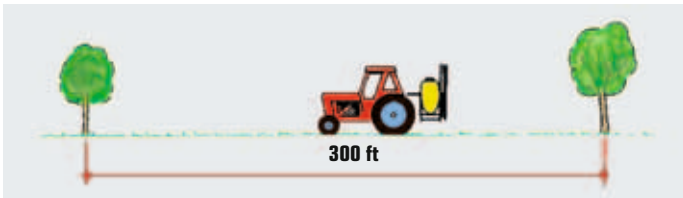


Calibration of field crop sprayers

Precise and 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 10 seconds to drive 300 ft then the spraying speed is 2.3 MPH.

Driving speed formula

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

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.



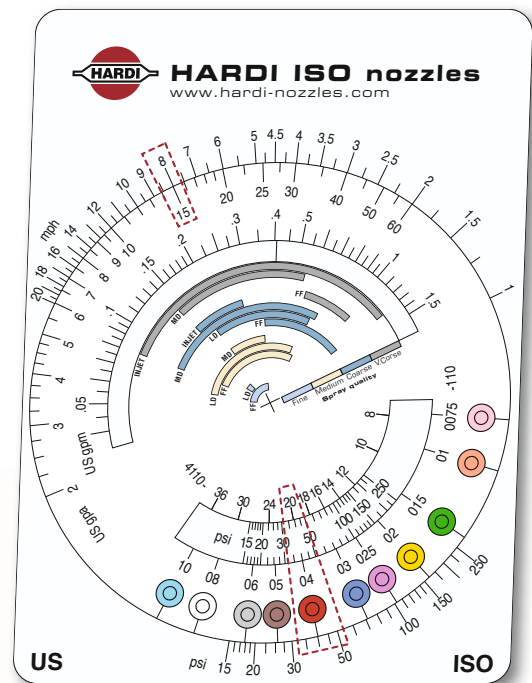
2 Select volume rate, nozzle and pressure

For easy selection of nozzles and pressure, use the HARDI® calibration disk (order no. 285721 - US or 285802 - metric).

Example

Volume rate 15 GPA
Driving speed 8 MPH
Nozzle ISO F-04-110

Pressure 40 PSI
Nozzle flow 0.40 GPM



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									





Calibration of field crop sprayers

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

Calibration formulas

Speed check

$$\frac{\text{Distance (ft)} \times 0.68}{\text{Time (sec.)}} = \text{MPH}$$

Application volume

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

Nozzle output

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

Pressure adjustment

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



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

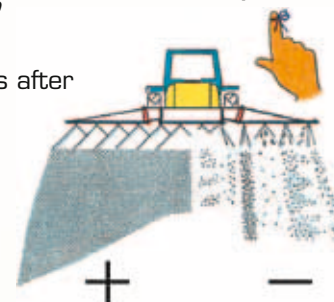
The nozzle has an output of 0.5 GPM at 40 PSI. If the density of the liquid fertilizer is 10.65 lbs/gal you have to multiply the calibration pressure – found when checking the nozzle flow with water – with the density factor. This gives an adjusted pressure of 45 PSI. The value can be found in the table at 40 PSI (calibrated pressure) and a density of 10.65 lbs/gal.

Density (lbs/gal)	9.00	10.00	10.65	11.00	12.00
Conversion factors	1.04	1.10	1.13	1.15	1.20
PSI	Adjusted pressure				
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?

HARDI® recommends:

1. Check water volume rates after every week.
2. Change your nozzles when the water volume rate they should deliver is exceeded by 10% in order to ensure accuracy of distribution and drop size.



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



HARDI® ISO nozzles



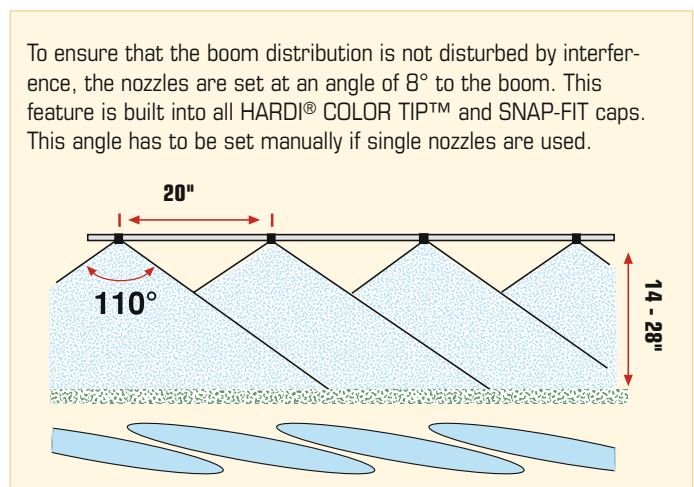
HARDI® ISO LD-110 - Low Drift nozzles

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

- ISO: Flow, color, coding and outer dimensions
- Working pressure: 20 to 70 PSI
- Restrictor designed for minimum chemical residues
- SYNTAL – precision molded thermoplastic
- CERAMIC – extremely high durability
- COLOR TIPS™ (CT) – (unibody tips and caps) for safe and easy handling

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).

HARDI® part 10423503 Nitril O-ring for HARDI® nozzles (Between Cap and Nozzle Body)



	PSI	GPM	GPA at MPH															
			5	6	7	8	9	10	11	12	14	16	18					
O1-Orange	SYNTAL-CT	371837 (12 pcs 755708)	SYNTAL-S	371817 (12 pcs 755698)														
	CERAMIC-CT	371842 (12 pcs 755713)	CERAMIC-S	371822 (12 pcs 755703)														
	20	0.071	M	4.2	3.5	3.0	2.6	2.3	2.1	1.9	1.8	1.5	1.3	1.2				
	30	0.087	M	5.1	4.3	3.7	3.2	2.9	2.6	2.3	2.1	1.8	1.6	1.4				
	40	0.100	M	5.9	5.0	4.2	3.7	3.3	3.0	2.7	2.5	2.1	1.9	1.7				
	50	0.112	M	6.6	5.5	4.7	4.2	3.7	3.3	3.0	2.8	2.4	2.1	1.8				
	60	0.122	M	7.3	6.1	5.2	4.5	4.0	3.6	3.3	3.0	2.6	2.3	2.0				
70	0.132	F	7.9	6.5	5.6	4.9	4.4	3.9	3.6	3.3	2.8	2.5	2.2					
O15-Green	SYNTAL-CT	371838 (12 pcs 755709)	SYNTAL-S	371818 (12 pcs 755699)														
	CERAMIC-CT	371843 (12 pcs 755714)	CERAMIC-S	371823 (12 pcs 755704)														
	20	0.106	M	6.3	5.3	4.5	3.9	3.5	3.2	2.9	2.6	2.3	2.0	1.8				
	30	0.130	M	7.7	6.4	5.5	4.8	4.3	3.9	3.5	3.2	2.8	2.4	2.1				
	40	0.150	M	8.9	7.4	6.4	5.6	5.0	4.5	4.1	3.7	3.2	2.8	2.5				
	50	0.168	M	10.0	8.3	7.1	6.2	5.5	5.0	4.5	4.2	3.6	3.1	2.8				
	60	0.184	M	10.9	9.1	7.8	6.8	6.1	5.5	5.0	4.5	3.9	3.4	3.0				
70	0.198	M	11.8	9.8	8.4	7.4	6.5	5.9	5.4	4.9	4.2	3.7	3.3					
O3-Blue	SYNTAL-CT	371840 (12 pcs. 755711)	SYNTAL-S	371820 (12 pcs. 755701)														
	CERAMIC-CT	371845 (12 pcs. 755716)	CERAMIC-S	371825 (12 pcs. 755706)														
	20	0.212	C	12.6	10.5	9.0	7.9	7.0	6.3	5.7	5.3	4.5	3.9	3.5				
	30	0.260	C	15.4	12.9	11.0	9.6	8.6	7.7	7.0	6.4	5.5	4.8	4.3				
	40	0.300	C	17.8	14.9	12.7	11.1	9.9	8.9	8.1	7.4	6.4	5.6	5.0				
	50	0.335	C	19.9	16.6	14.2	12.5	11.1	10.0	9.1	8.3	7.1	6.2	5.5				
	60	0.367	M	21.8	18.2	15.6	13.6	12.1	10.9	9.9	9.1	7.8	6.8	6.1				
70	0.397	M	23.6	19.6	16.8	14.7	13.1	11.8	10.7	9.8	8.4	7.4	6.5					
O4-Red	SYNTAL-CT	371841 (12 pcs. 755712)	SYNTAL-S	371821 (12 pcs. 755702)														
	CERAMIC-CT	371846 (12 pcs. 755717)	CERAMIC-S	371826 (12 pcs. 755707)														
	20	0.283	C	16.8	14.0	12.0	10.5	9.3	8.4	7.6	7.0	6.0	5.3	4.7				
	30	0.346	C	20.6	17.1	14.7	12.9	11.4	10.3	9.4	8.6	7.3	6.4	5.7				
	40	0.400	C	23.8	19.8	17.0	14.9	13.2	11.9	10.8	9.9	8.5	7.4	6.6				
	50	0.447	C	26.6	22.1	19.0	16.6	14.8	13.3	12.1	11.1	9.5	8.3	7.4				
	60	0.490	C	29.1	24.2	20.8	18.2	16.2	14.5	13.2	12.1	10.4	9.1	8.1				
70	0.529	M	31.4	26.2	22.5	19.6	17.5	15.7	14.3	13.1	11.2	9.8	8.7					
O25-Lilac	SYNTAL-CT	371958 (12 pcs 750630)	SYNTAL-S	371957 (12 pcs 750632)														
	20	0.177	C	10.5	8.8	7.5	6.6	5.8	5.3	4.8	4.4	3.8	3.3	2.9				
	30	0.217	C	12.9	10.7	9.2	8.0	7.1	6.4	5.8	5.4	4.6	4.0	3.6				
	40	0.250	M	14.9	12.4	10.6	9.3	8.3	7.4	6.8	6.2	5.3	4.6	4.1				
	50	0.280	M	16.6	13.8	11.9	10.4	9.2	8.3	7.5	6.9	5.9	5.2	4.6				
	60	0.306	M	18.2	15.2	13.0	11.4	10.1	9.1	8.3	7.6	6.5	5.7	5.1				
	70	0.331	M	19.6	16.4	14.0	12.3	10.9	9.8	8.9	8.2	7.0	6.1	5.5				
O5-Brown	SYNTAL-CT	371894 (12 pcs. 755815)	SYNTAL-S	371893 (12 pcs. 755817)														
	CERAMIC-CT	371897 (12 pcs. 755816)	CERAMIC-S	371896 (12 pcs. 755818)														
	20	0.354	C	21.0	17.5	15.0	13.1	11.7	10.5	9.5	8.8	7.5	6.6	5.8				
	30	0.433	C	25.7	21.4	18.4	16.1	14.3	12.9	11.7	10.7	9.2	8.0	7.1				
	40	0.500	C	29.7	24.8	21.2	18.6	16.5	14.9	13.5	12.4	10.6	9.3	8.3				
	50	0.559	C	33.2	27.7	23.7	20.8	18.4	16.6	15.1	13.8	11.9	10.4	9.2				
	60	0.612	C	36.4	30.3	26.0	22.7	20.2	18.2	16.5	15.2	13.0	11.4	10.1				
70	0.661	C	39.3	32.7	28.1	24.6	21.8	19.6	17.9	16.4	14.0	12.3	10.9					

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

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





HARDI® ISO MINIDRIFT



HARDI® ISO MINIDRIFT air inclusion nozzles

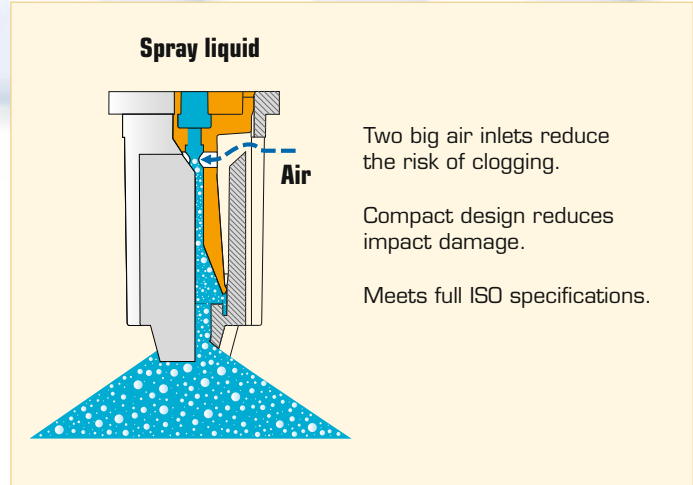
The HARDI® MINIDRIFT nozzle can be used for spraying at sub-optimal weather conditions, when spraying cannot be postponed. The MINIDRIFT nozzle will, at low pressures, reduce drift to a minimum. HARDI® part 10423503 Nitril O-ring for HARDI® nozzles (Between Cap and Nozzle Body).

- Air inclusion nozzle
- Working pressure: 20 to 70 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 medium 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.



	PSI	GPM	GPA at MPH															
			5	6	7	8	9	10	11	12	14	16	18					
015-Green	SYNTAL-CT 372121 (12 pcs. 75083100) SYNTAL-S 372111 (12 pcs. 75082100)		20	0.106	C	6.3	5.3	4.5	3.9	3.5	3.2	2.9	2.6	2.3	2.0	1.8		
	30	0.130	C	7.7	6.4	5.5	4.8	4.3	3.9	3.5	3.2	2.8	2.4	2.1				
	40	0.150	C	8.9	7.4	6.4	5.6	5.0	4.5	4.1	3.7	3.2	2.8	2.5				
	50	0.168	C	10.0	8.3	7.1	6.2	5.5	5.0	4.5	4.2	3.6	3.1	2.8				
	60	0.184	M	10.9	9.1	7.8	6.8	6.1	5.5	5.0	4.5	3.9	3.4	3.0				
	70	0.198	M	11.8	9.8	8.4	7.4	6.5	5.9	5.4	4.9	4.2	3.7	3.3				

	PSI	GPM	GPA at MPH															
			5	6	7	8	9	10	11	12	14	16	18					
03-Blue	SYNTAL-CT 372124 (12 pcs. 75083400) SYNTAL-S 372114 (12 pcs. 75082400)		20	0.212	VC	12.6	10.5	9.0	7.9	7.0	6.3	5.7	5.3	4.5	3.9	3.5		
	30	0.260	VC	15.4	12.9	11.0	9.6	8.6	7.7	7.0	6.4	5.5	4.8	4.3				
	40	0.300	VC	17.8	14.9	12.7	11.1	9.9	8.9	8.1	7.4	6.4	5.6	5.0				
	50	0.335	C	19.9	16.6	14.2	12.5	11.1	10.0	9.1	8.3	7.1	6.2	5.5				
	60	0.367	C	21.8	18.2	15.6	13.6	12.1	10.9	9.9	9.1	7.8	6.8	6.1				
	70	0.397	C	23.6	19.6	16.8	14.7	13.1	11.8	10.7	9.8	8.4	7.4	6.5				

	PSI	GPM	GPA at MPH															
			5	6	7	8	9	10	11	12	14	16	18					
02-Yellow	SYNTAL-CT 372122 (12 pcs. 75083200) SYNTAL-S 372112 (12 pcs. 75082200)		20	0.141	VC	8.4	7.0	6.0	5.3	4.7	4.2	3.8	3.5	3.0	2.6	2.3		
	30	0.173	C	10.3	8.6	7.3	6.4	5.7	5.1	4.7	4.3	3.7	3.2	2.9				
	40	0.200	C	11.9	9.9	8.5	7.4	6.6	5.9	5.4	5.0	4.2	3.7	3.3				
	50	0.224	C	13.3	11.1	9.5	8.3	7.4	6.6	6.0	5.5	4.7	4.2	3.7				
	60	0.245	C	14.5	12.1	10.4	9.1	8.1	7.3	6.6	6.1	5.2	4.5	4.0				
	70	0.265	M	15.7	13.1	11.2	9.8	8.7	7.9	7.1	6.5	5.6	4.9	4.4				

	PSI	GPM	GPA at MPH															
			5	6	7	8	9	10	11	12	14	16	18					
04-Red	SYNTAL-CT 372125 (12 pcs. 75083500) SYNTAL-S 372115 (12 pcs. 75082500)		20	0.283	VC	16.8	14.0	12.0	10.5	9.3	8.4	7.6	7.0	6.0	5.3	4.7		
	30	0.346	VC	20.6	17.1	14.7	12.9	11.4	10.3	9.4	8.6	7.3	6.4	5.7				
	40	0.400	VC	23.8	19.8	17.0	14.9	13.2	11.9	10.8	9.9	8.5	7.4	6.6				
	50	0.447	VC	26.6	22.1	19.0	16.6	14.8	13.3	12.1	11.1	9.5	8.3	7.4				
	60	0.490	C	29.1	24.2	20.8	18.2	16.2	14.5	13.2	12.1	10.4	9.1	8.1				
	70	0.529	C	31.4	26.2	22.5	19.6	17.5	15.7	14.3	13.1	11.2	9.8	8.7				

	PSI	GPM	GPA at MPH															
			5	6	7	8	9	10	11	12	14	16	18					
025-Lilac	SYNTAL-CT 372123 (12 pcs. 75083300) SYNTAL-S 372113 (12 pcs. 75082300)		20	0.177	VC	10.5	8.8	7.5	6.6	5.8	5.3	4.8	4.4	3.8	3.3	2.9		
	30	0.217	VC	12.9	10.7	9.2	8.0	7.1	6.4	5.8	5.4	4.6	4.0	3.6				
	40	0.250	C	14.9	12.4	10.6	9.3	8.3	7.4	6.8	6.2	5.3	4.6	4.1				
	50	0.280	C	16.6	13.8	11.9	10.4	9.2	8.3	7.5	6.9	5.9	5.2	4.6				
	60	0.306	C	18.2	15.2	13.0	11.4	10.1	9.1	8.3	7.6	6.5	5.7	5.1				
	70	0.331	M	19.6	16.4	14.0	12.3	10.9	9.8	8.9	8.2	7.0	6.1	5.5				

	PSI	GPM	GPA at MPH															
			5	6	7	8	9	10	11	12	14	16	18					
05-Brown	SYNTAL-CT 372126 (12 pcs. 75083600) SYNTAL-S 372116 (12 pcs. 75082600)		20	0.354	VC	21.0	17.5	15.0	13.1	11.7	10.5	9.5	8.8	7.5	6.6	5.8		
	30	0.433	VC	25.7	21.4	18.4	16.1	14.3	12.9	11.7	10.7	9.2	8.0	7.1				
	40	0.500	VC	29.7	24.8	21.2	18.6	16.5	14.9	13.5	12.4	10.6	9.3	8.3				
	50	0.559	VC	33.2	27.7	23.7	20.8	18.4	16.6	15.1	13.8	11.9	10.4	9.2				
	60	0.612	C	36.4	30.3	26.0	22.7	20.2	18.2	16.5	15.2	13.0	11.4	10.1				
	70	0.661	C	39.3	32.7	28.1	24.6	21.8	19.6	17.9	16.4	14.0	12.3	10.9				

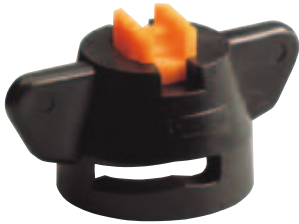




HARDI® ISO nozzles

HARDI® ISO F-80 - Flat Fan nozzles

This nozzle has an 80° spray angle. On boom sizes from 80 ft to 120 ft the boom height is often higher than 20" above the target. 80° nozzles provide good coverage with reduced risk of drift at higher boom heights and are also adaptable to band spraying.

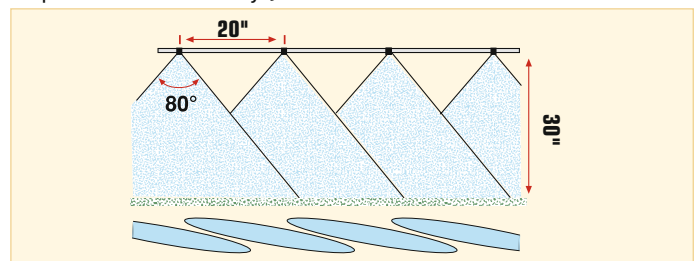


- ISO: Flow, color, coding and outer dimensions
- 80° spray angle
- Working pressure: 20 to 70 PSI
- SYNTAL – precision molded thermoplastic
- CERAMIC - extremely high durability
- COLOR TIPS™ (CT) – (unibody tips and caps) for safe and easy handling

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

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

The 80° nozzles can be fitted on HARDI® sprayers using the black 334083 ISO/INJET™ cap. HARDI® part 10423503 Nitril O-ring for HARDI® nozzles (Between Cap and Nozzle Body)



PSI	GPM	GPA at MPH										
		5	6	7	8	9	10	11	12	14	16	18

01-Orange	SYNTAL-S 371931 (12 pcs. 750640)													
	20 0.071	4.2	3.5	3.0	2.6	2.3	2.1	1.9	1.8	1.5	1.3	1.2		
	30 0.087	5.1	4.3	3.7	3.2	2.9	2.6	2.3	2.1	1.8	1.6	1.4		
	40 0.100	5.9	5.0	4.2	3.7	3.3	3.0	2.7	2.5	2.1	1.9	1.7		
	50 0.112	6.6	5.5	4.7	4.2	3.7	3.3	3.0	2.8	2.4	2.1	1.8		
	60 0.122	7.3	6.1	5.2	4.5	4.0	3.6	3.3	3.0	2.6	2.3	2.0		
	70 0.132	7.9	6.5	5.6	4.9	4.4	3.9	3.6	3.3	2.8	2.5	2.2		

PSI	GPM	GPA at MPH										
		5	6	7	8	9	10	11	12	14	16	18

02-Yellow	SYNTAL-S 371933 (12 pcs. 750642)													
	20 0.141	8.4	7.0	6.0	5.3	4.7	4.2	3.8	3.5	3.0	2.6	2.3		
	30 0.173	10.3	8.6	7.3	6.4	5.7	5.1	4.7	4.3	3.7	3.2	2.9		
	40 0.200	11.9	9.9	8.5	7.4	6.6	5.9	5.4	5.0	4.2	3.7	3.3		
	50 0.224	13.3	11.1	9.5	8.3	7.4	6.6	6.0	5.5	4.7	4.2	3.7		
	60 0.245	14.5	12.1	10.4	9.1	8.1	7.3	6.6	6.1	5.2	4.5	4.0		
	70 0.265	15.7	13.1	11.2	9.8	8.7	7.9	7.1	6.5	5.6	4.9	4.4		

015-Green	SYNTAL-S 371932 (12 pcs. 750641)													
	20 0.106	6.3	5.3	4.5	3.9	3.5	3.2	2.9	2.6	2.3	2.0	1.8		
	30 0.130	7.7	6.4	5.5	4.8	4.3	3.9	3.5	3.2	2.8	2.4	2.1		
	40 0.150	8.9	7.4	6.4	5.6	5.0	4.5	4.1	3.7	3.2	2.8	2.5		
	50 0.168	10.0	8.3	7.1	6.2	5.5	5.0	4.5	4.2	3.6	3.1	2.8		
	60 0.184	10.9	9.1	7.8	6.8	6.1	5.5	5.0	4.5	3.9	3.4	3.0		
	70 0.198	11.8	9.8	8.4	7.4	6.5	5.9	5.4	4.9	4.2	3.7	3.3		

03-Blue	SYNTAL-S 371934 (12 pcs. 750643)													
	20 0.212	12.6	10.5	9.0	7.9	7.0	6.3	5.7	5.3	4.5	3.9	3.5		
	30 0.260	15.4	12.9	11.0	9.6	8.6	7.7	7.0	6.4	5.5	4.8	4.3		
	40 0.300	17.8	14.9	12.7	11.1	9.9	8.9	8.1	7.4	6.4	5.6	5.0		
	50 0.335	19.9	16.6	14.2	12.5	11.1	10.0	9.1	8.3	7.1	6.2	5.5		
	60 0.367	21.8	18.2	15.6	13.6	12.1	10.9	9.9	9.1	7.8	6.8	6.1		
	70 0.397	23.6	19.6	16.8	14.7	13.1	11.8	10.7	9.8	8.4	7.4	6.5		



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

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





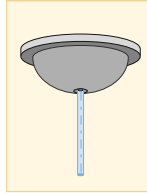
Liquid fertilizer

1553 Solid stream nozzle

HARDI® 1553 Cone nozzles are used without swirl plates for solid stream (with swirl plates for hollow cone and full cone spraying - please see page 19). 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 to 8.27 GPM (at 15–360 PSI)
- SYNTAL – precision molded thermoplastic: precise, resistant and durable



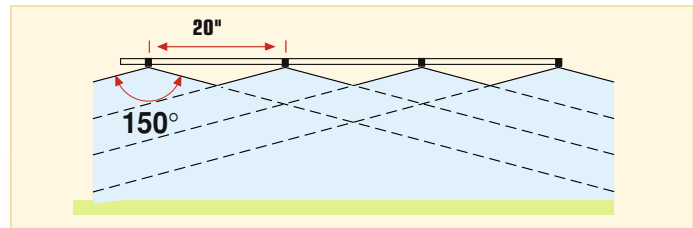
PSI	GPM													
	1553-8	-10	-12	-14	-16	-18	-20	-22	-24	-30	-35	-40		
15	0.077	0.115	0.171	0.224	0.305	0.367	0.489	0.588	0.682	1.047	1.386	1.688		
20	0.089	0.133	0.197	0.259	0.352	0.423	0.565	0.678	0.787	1.209	1.600	1.949		
30	0.109	0.163	0.241	0.317	0.431	0.518	0.692	0.831	0.964	1.480	1.960	2.387		
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	11	12	14	16	18		
Large drop flat spray nozzle (371551) + 1553-14 Grey (370042)														
20	0.262	15.5	13.0	11.1	9.7	8.6	7.8	7.1	6.5	5.6	4.9	4.3		
25	0.293	17.4	14.5	12.4	10.9	9.7	8.7	7.9	7.2	6.2	5.4	4.8		
30	0.321	19.0	15.9	13.6	11.9	10.6	9.5	8.7	7.9	6.8	5.9	5.3		
40	0.370	22.0	18.3	15.7	13.7	12.2	11.0	10.0	9.2	7.9	6.9	6.1		
50	0.414	24.6	20.5	17.6	15.4	13.7	12.3	11.2	10.2	8.8	7.7	6.8		
70	0.490	29.1	24.2	20.8	18.2	16.2	14.5	13.2	12.1	10.4	9.1	8.1		

PSI	GPM	GPA at MPH												
		5	6	7	8	9	10	11	12	14	16	18		
Large drop flat spray nozzle (371551) + 1553-20 Grey (370075)														
20	0.577	34.3	28.5	24.5	21.4	19.0	17.1	15.6	14.3	12.2	10.7	9.5		
25	0.645	38.3	31.9	27.4	23.9	21.3	19.1	17.4	16.0	13.7	12.0	10.6		
30	0.706	41.9	35.0	30.0	26.2	23.3	21.0	19.1	17.5	15.0	13.1	11.7		
40	0.815	48.4	40.4	34.6	30.3	26.9	24.2	22.0	20.2	17.3	15.1	13.5		
50	0.912	54.2	45.1	38.7	33.8	30.1	27.1	24.6	22.6	19.3	16.9	15.0		
70	1.079	64.1	53.4	45.8	40.0	35.6	32.0	29.1	26.7	22.9	20.0	17.8		

PSI	GPM	GPA at MPH												
		5	6	7	8	9	10	11	12	14	16	18		
Large drop flat spray nozzle (371551) + 1553-16 Grey (370053)														
20	0.358	21.3	17.7	15.2	13.3	11.8	10.6	9.7	8.9	7.6	6.6	5.9		
25	0.400	23.8	19.8	17.0	14.9	13.2	11.9	10.8	9.9	8.5	7.4	6.6		
30	0.439	26.0	21.7	18.6	16.3	14.5	13.0	11.8	10.9	9.3	8.1	7.2		
40	0.506	30.1	25.1	21.5	18.8	16.7	15.0	13.7	12.5	10.7	9.4	8.4		
50	0.566	33.6	28.0	24.0	21.0	18.7	16.8	15.3	14.0	12.0	10.5	9.3		
70	0.670	39.8	33.2	28.4	24.9	22.1	19.9	18.1	16.6	14.2	12.4	11.1		

PSI	GPM	GPA at MPH												
		5	6	7	8	9	10	11	12	14	16	18		
Large drop flat spray nozzle (371551) + 1553-22 Grey (370086)														
20	0.691	41.0	34.2	29.3	25.6	22.8	20.5	18.6	17.1	14.7	12.8	11.4		
25	0.772	45.9	38.2	32.8	28.7	25.5	22.9	20.9	19.1	16.4	14.3	12.7		
30	0.846	50.2	41.9	35.9	31.4	27.9	25.1	22.8	20.9	17.9	15.7	14.0		
40	0.977	58.0	48.4	41.4	36.3	32.2	29.0	26.4	24.2	20.7	18.1	16.1		
50	1.092	64.9	54.1	46.3	40.5	36.0	32.4	29.5	27.0	23.2	20.3	18.0		
70	1.292	76.8	64.0	54.8	48.0	42.6	38.4	34.9	32.0	27.4	24.0	21.3		

PSI	GPM	GPA at MPH												
		5	6	7	8	9	10	11	12	14	16	18		
Large drop flat spray nozzle (371551) + 1553-18 Grey (370064)														
20	0.429	25.5	21.3	18.2	15.9	14.2	12.8	11.6	10.6	9.1	8.0	7.1		
25	0.480	28.5	23.8	20.4	17.8	15.8	14.3	13.0	11.9	10.2	8.9	7.9		
30	0.526	31.2	26.0	22.3	19.5	17.4	15.6	14.2	13.0	11.2	9.8	8.7		
40	0.607	36.1	30.1	25.8	22.5	20.0	18.0	16.4	15.0	12.9	11.3	10.0		
50	0.679	40.3	33.6	28.8	25.2	22.4	20.2	18.3	16.8	14.4	12.6	11.2		
70	0.803	47.7	39.8	34.1	29.8	26.5	23.9	21.7	19.9	17.0	14.9	13.3		

PSI	GPM	GPA at MPH												
		5	6	7	8	9	10	11	12	14	16	18		
Large drop flat spray nozzle (371551) + 1553-24 Grey (370097)														
20	0.807	47.9	40.0	34.2	30.0	26.6	24.0	21.8	20.0	17.1	15.0	13.3		
25	0.902	53.6	44.7	38.3	33.5	29.8	26.8	24.4	22.3	19.1	16.8	14.9		
30	0.989	58.7	48.9	41.9	36.7	32.6	29.4	26.7	24.5	21.0	18.3	16.3		
40	1.141	67.8	56.5	48.4	42.4	37.7	33.9	30.8	28.3	24.2	21.2	18.8		
50	1.276	75.8	63.2	54.1	47.4	42.1	37.9	34.5	31.6	27.1	23.7	21.1		
70	1.510	89.7	74.7	64.1	56.1	49.8	44.8	40.8	37.4	32.0	28.0	24.9		

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





Calibration of mistblowers

1 Calibration of forward speed

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

2 Calculation of nozzle size and pressure

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

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

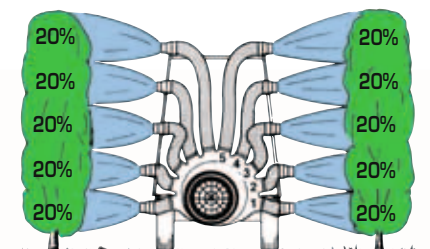
Example Row spacing: 18 ft
Application rate: 40 GPA
Forward speed: 3 MPH

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

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 direct-

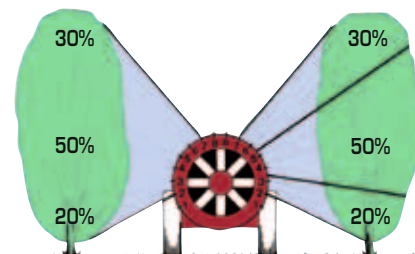
ing the water into the jug, using a hose. If exactly 0.44 GPM is desired, the pressure can be adjusted with the pressure adjustment formula:

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

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 19 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.





Ceramic hollow cone nozzles



HARDI® 1299 Hollow cone nozzles

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

- High efficiency nozzles
- Best choice for vineyard and 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 droplegs for under leaf spraying where turbulence is required for good coverage. Also used on hand-held sprayers for insecticide and fungicide application and for band spraying.

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

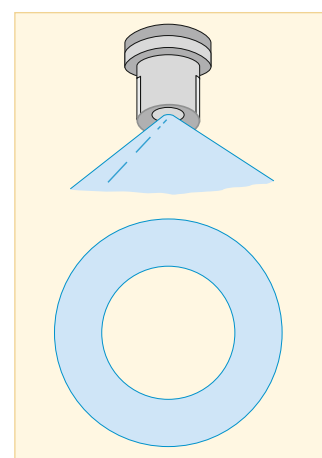
PSI		GPM
1299-14 Orange 371511		
40	F	0.188
70	VF	0.243
90	VF	0.273
120	VF	0.311
140	VF	0.334
220	VF	0.412

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



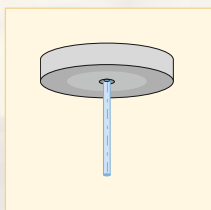
PSI		GPM
1299-20 Blue 371514		
40	M	0.518
70	M	0.670
90	F	0.752
120	F	0.859
140	F	0.922
220	F	1.135

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

1099 Solid stream nozzle - CERAMIC

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

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



1099 PSI	1099-8		1099-10		1099-12		1099-15		1099-18		1099-20		1099-23		1099-30	
	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 nozzle

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

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 has a medium (M) droplet spectrum. The white swirl plate has a medium (M) droplet spectrum and is giving a full cone spray.

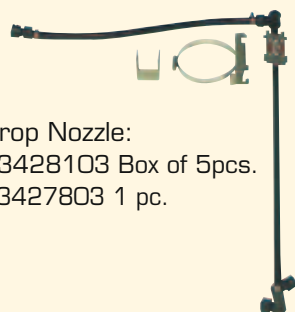


Large drop adaptor



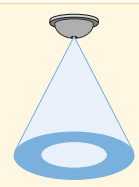
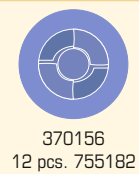
A large drop adaptor (371077) is available for the grey swirl plate.

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



Drop Nozzle:
83428103 Box of 5pcs.
83427803 1 pc.

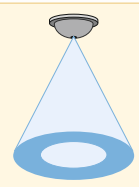
1553	-8	-10	-12	-14	-16	-18	-20	-22	-24	-30	-35	-40
PSI	GPM											
30	0.06	0.08	0.09	0.10	0.12	0.13	0.14	0.15	0.16	0.19	0.21	0.23
35	0.06	0.08	0.10	0.11	0.13	0.14	0.15	0.17	0.18	0.21	0.22	0.25
40	0.07	0.09	0.10	0.12	0.14	0.15	0.17	0.18	0.19	0.22	0.24	0.27
50	0.08	0.10	0.12	0.13	0.15	0.17	0.18	0.20	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



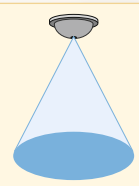
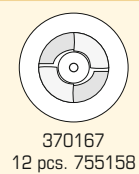
1553	-8	-10	-12	-14	-16	-18	-20	-22	-24	-30	-35	-40
PSI	GPM											
30	0.11	0.13	0.18	0.22	0.26	0.30	0.34	0.38	0.41	0.52	0.60	0.67
35	0.11	0.15	0.19	0.23	0.28	0.32	0.37	0.41	0.44	0.57	0.65	0.73
40	0.12	0.16	0.20	0.25	0.30	0.34	0.39	0.43	0.47	0.61	0.70	0.78
50	0.14	0.17	0.23	0.28	0.33	0.38	0.44	0.49	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
PSI	GPM											
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
PSI	GPM									
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 Practice spraying at comfortable walking speed and with correct nozzle height.



5 Fill up with clean water.



6 Spray 1000 sq.ft.

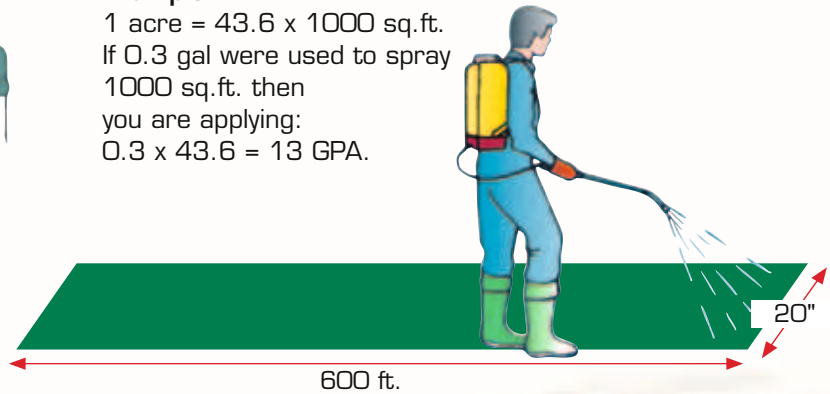
Swath width inch	Spraying distance ft.
20	600
27	444
40	300
47	255
75	160

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 nozzle - SYNTAL



- Hollow cone nozzle for knapsack sprayers
- Flow from 0.14 to 0.80 GPM (at 20 - 70 PSI)
- SYNTAL



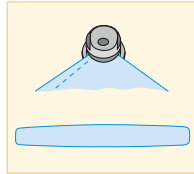
This nozzle is special designed for knapsack sprayers. The restrictor and the nozzles are fixed together to avoid losing parts when taken apart for cleaning.

	Yellow	Red	Brown	Grey
PSI	GPM			
20	0.143	0.251	0.322	0.430
25	0.160	0.280	0.360	0.481
30	0.176	0.307	0.395	0.527
40	0.203	0.355	0.456	0.608
50	0.227	0.397	0.510	0.680
70	0.268	0.469	0.603	0.804
No.	371694	371682	371695	371696

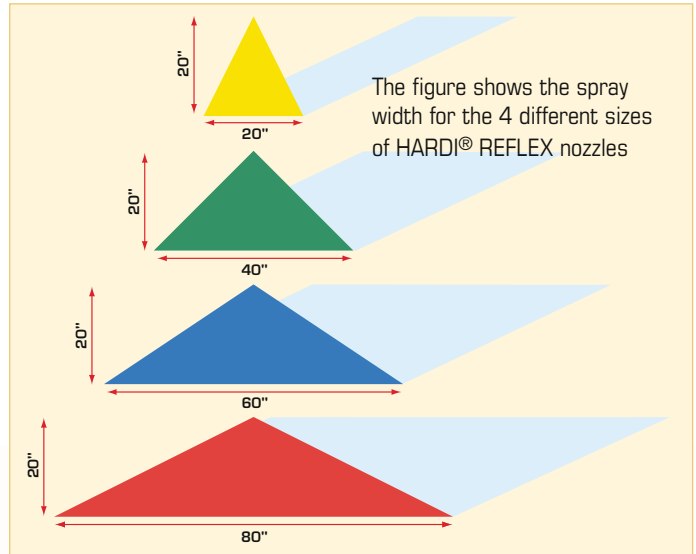
HARDI® REFLEX nozzle - SYNTAL



- 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.

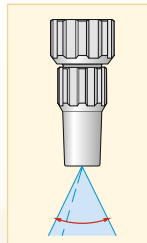


	Yellow	Green	Blue	Red
PSI	GPM			
15	0.16	0.32	0.48	0.64
No.	372020	372021	372022	372023

Adjustable nozzle - SYNTAL



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



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

No. 755835			
	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°



Band spraying

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

CALIBRATION FOR BAND SPRAYING

1 Forward speed

See page 8 – Calibration of field sprayers

2 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**.

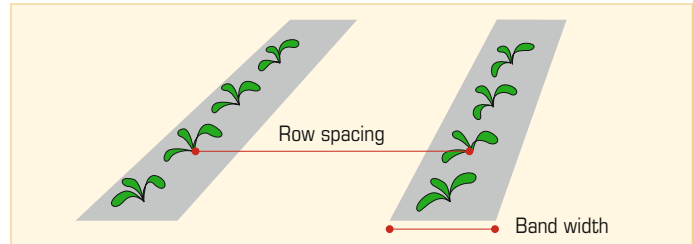
3 Calculation of nozzle capacity

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

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:

$$\frac{10 \times 20 \times 10}{30} = 66.7 \text{ gallons}$$

5 Calculation of chemical per tank

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

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:

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

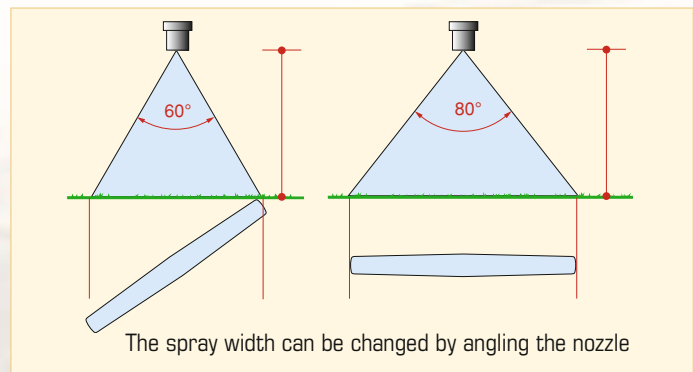
Even spray nozzle

HARDI® 4680E 80° Even spray nozzle – SYNTAL



- Even distribution is ideal for band spraying
- Use the 4680E on hand operated sprayers, when only one nozzle is used
- Application range: 0.06 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 nozzle 3/8" - SYNTAL



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

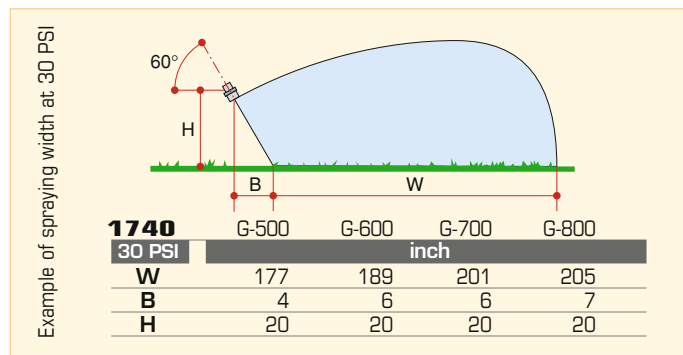
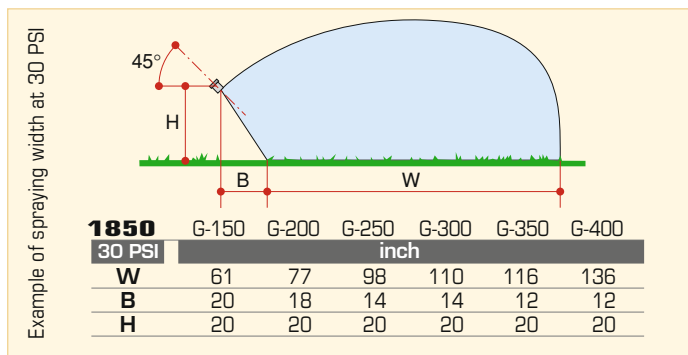
This nozzle is mounted on the end of the boom tube using the 730076 mounting kit.

1740 End nozzle 1/2" - SYNTAL



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

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



1850	G-150	G-200	G-250	G-300	G-350	G-400
PSI	GPM					
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	G-500	G-600	G-700	G-800
PSI	GPM			
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

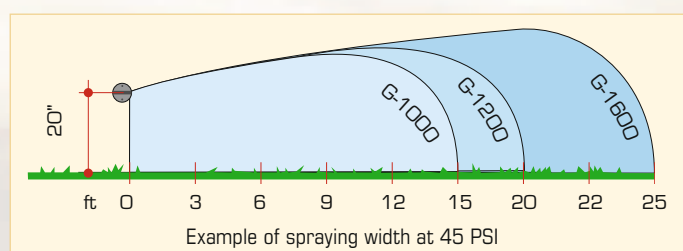
G - Giant end nozzle - SYNTAL



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

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

	G-1000 Red	G-1200 White	G-1600 Blue
PSI	GPM		
20	3.224	3.762	5.015
30	3.949	4.607	6.143
40	4.560	5.320	7.093
50	5.098	5.948	7.930
70	6.032	7.037	9.383
No.	371556	371557	371558





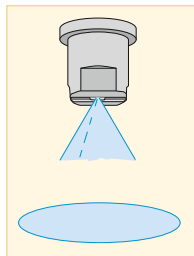
Special nozzles

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

4665 65° Flat spray nozzle – SYNTAL



- Recommended pressure range: 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.

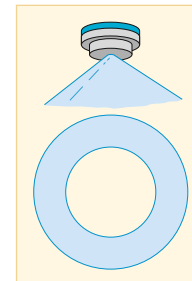
This nozzle has additional applications for industrial purposes.

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

5131 Misting nozzle – SYNTAL



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



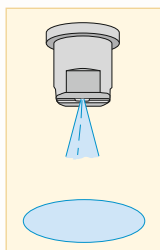
This nozzle consists of a synthetic tip and a blue swirl plate (370156). The droplet spectrum is very fine (VF). The low capacity and extremely fine atomization make this nozzle useful for special purposes such as adjustment of air temperature and humidity in hot climates.

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

4625 25° Flat spray nozzle – SYNTAL



- Pressure range: 35 - 350 PSI
- SYNTAL



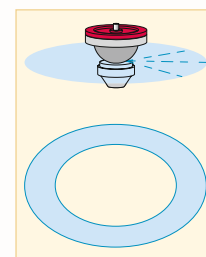
This nozzle provides an elliptical spray pattern (flat fan) with a 25° angle. The narrow spray angle results in a high impact spray, which is well suited for cleaning as well as for spraying trees and bushes, where a long range is very useful.

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	370554

3600 Deflector spray nozzle – 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



Special nozzles

Multi-hole rinsing nozzle - SYNTAL



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



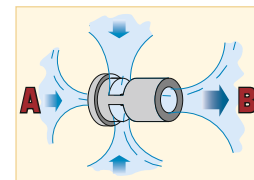
- Rotary rinsing nozzle
- Rotary spray swaths
- Pointed top for easy foil opening
- SYNTAL

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.

5066 Agitation nozzle - SYNTAL

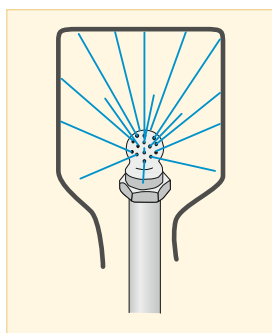


- Pressure range: 15 - 225 PSI
- SYNTAL



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, for example, pesticides in suspension.



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

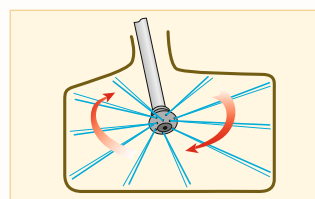
5066	5066-1.5		5066-2.0		5066-2.5		5066-3.0	
PSI	GPM							
	A	B	A	B	A	B	A	B
15	0.32	1.98	0.49	2.45	0.82	3.15	1.37	4.07
22	0.39	2.39	0.60	2.97	0.99	3.82	1.66	4.92
30	0.46	2.79	0.70	3.47	1.16	4.46	1.93	5.75
45	0.56	3.42	0.85	4.25	1.42	5.46	2.37	7.04
75	0.72	4.42	1.10	5.48	1.83	7.05	3.06	9.09
90	0.79	4.84	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 nozzle



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

This nozzle is made for cleaning the insides of sprayer tanks. The different angle of the 8 solid streams ensures 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® DUOCAP



HARDI® DUOCAP gives you higher volume rate while still maintaining proper droplet size. Fitted with two F 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 that ensures good coverage in the top of the crop and coarse droplets that penetrates to the lower and more dense areas.

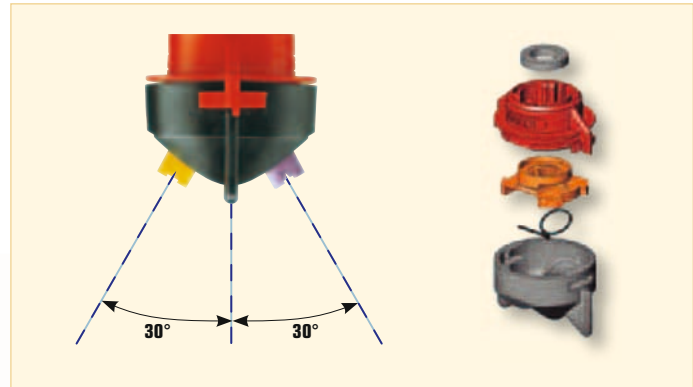
HARDI® DUOCAP fitted with two MINIDRIFT nozzles will give superior penetration into dense crops like Potatoes and Soybeans.

The advantages of the two nozzle cap with HARDI® LD ISO nozzles:

- Compact
- Easy to assemble two piece design
- Ability to apply higher GPA rate while still maintaining proper droplet size for fungicide applications.
- 30-degree forward and rearward trajectory for increased canopy penetration.
- Allows for increased field speed, which maximizes efficiency.



Order Number	Description
70056803	HARDI® DUOCAP with 2-Orange LD O1 tips
70056903	HARDI® DUOCAP with 2-Green LD O15 tips
70057003	HARDI® DUOCAP with 2-Yellow LD O2 tips
70057103	HARDI® DUOCAP with 2-Lilac LD O25 tips
70057203	HARDI® DUOCAP with 2-Blue LD O3 tips
70057303	HARDI® DUOCAP with 2-Red LD O4 tips
70057403	HARDI® DUOCAP with 2-Brown LD O5 tips
28032503	HARDI® DUOCAP only
28040103	O-ring seal for nozzle
10423503	O-ring seal for cap



HARDI® DUOCAP with 2 HARDI® LD-110 LowDrift Tips

	PSI	GPM	🌧️	GPA at MPH												
				5	6	7	8	9	10	11	12	14	16	18		
O15-Green	20	0.212	M	12.6	10.6	9.0	7.8	7.0	6.4	5.8	5.2	4.6	4.0	3.6		
	30	0.260	M	15.4	12.8	11.0	9.6	8.6	7.8	7.0	6.4	5.6	4.8	4.2		
	40	0.300	M	17.8	14.8	12.8	11.2	10.0	9.0	8.2	7.4	6.4	5.6	5.0		
	50	0.336	M	20.0	16.6	14.2	12.4	11.0	10.0	9.0	8.4	7.2	6.2	5.6		
	60	0.368	M	21.8	18.2	15.6	13.6	12.2	11.0	10.0	9.0	7.8	6.8	6.0		
	60	0.396	M	23.6	19.6	16.8	14.8	13.0	11.8	10.8	9.8	8.4	7.4	6.6		
	70	0.396	M	23.6	19.6	16.8	14.8	13.0	11.8	10.8	9.8	8.4	7.4	6.6		
O2-Yellow	20	0.282	M	16.8	14.0	12.0	10.6	9.4	8.2	7.6	7.0	6.0	5.2	4.6		
	30	0.346	M	20.6	17.2	14.6	12.8	11.4	10.2	9.4	8.6	7.4	6.4	5.8		
	40	0.400	M	23.8	19.8	17.0	14.8	13.2	11.8	10.8	10.0	8.4	7.4	6.6		
	50	0.448	M	26.6	22.2	19.0	16.6	14.8	13.2	12.0	11.0	9.4	8.4	7.4		
	60	0.490	M	29.0	24.2	20.8	18.2	16.2	14.6	13.2	12.2	10.4	9.0	8.0		
	60	0.530	M	31.4	26.2	22.4	19.6	17.4	15.8	14.2	13.0	11.2	9.8	8.8		
	70	0.530	M	31.4	26.2	22.4	19.6	17.4	15.8	14.2	13.0	11.2	9.8	8.8		
O25-Lilac	20	0.354	C	21.0	17.6	15.0	13.2	11.6	10.6	9.8	8.8	7.6	6.6	5.8		
	30	0.434	C	25.8	21.4	18.4	16.0	14.2	12.8	11.6	10.8	9.2	8.0	7.2		
	40	0.500	M	29.8	24.8	21.2	18.6	16.6	14.8	13.6	12.4	10.6	9.2	8.2		
	50	0.560	M	33.2	27.6	23.8	20.8	18.4	16.6	15.0	13.8	11.8	10.4	9.2		
	60	0.612	M	36.4	30.4	26.0	22.8	20.2	18.2	16.6	15.2	13.0	11.4	10.2		
	60	0.662	M	39.2	32.8	28.0	24.6	21.8	19.6	17.8	16.4	14.0	12.2	11.0		
	70	0.662	M	39.2	32.8	28.0	24.6	21.8	19.6	17.8	16.4	14.0	12.2	11.0		

	PSI	GPM	🌧️	GPA at MPH												
				5	6	7	8	9	10	11	12	14	16	18		
O3-Blue	20	0.424	C	25.2	21.0	18.0	15.8	14.0	12.6	11.4	10.6	9.0	7.8	7.0		
	30	0.520	C	30.8	25.8	22.0	19.2	17.2	15.4	14.0	12.8	11.0	9.6	8.6		
	40	0.600	C	35.6	29.8	25.4	22.2	19.8	17.8	16.2	14.8	12.8	11.2	10.0		
	50	0.670	C	39.8	33.2	28.4	25.0	22.2	20.0	18.2	16.6	14.2	12.4	11.0		
	60	0.734	M	43.6	36.4	31.2	27.2	24.2	21.8	19.8	18.2	15.6	13.6	12.2		
	60	0.794	M	47.2	39.2	33.6	29.4	26.2	23.6	21.4	19.6	16.8	14.8	13.0		
	70	0.794	M	47.2	39.2	33.6	29.4	26.2	23.6	21.4	19.6	16.8	14.8	13.0		
O4-Red	20	0.566	C	33.6	28.0	24.0	21.0	18.6	16.8	15.2	14.0	12.0	10.6	9.4		
	30	0.692	C	41.2	34.2	29.4	25.8	22.8	20.6	18.8	17.2	14.6	12.8	11.4		
	40	0.800	C	47.6	39.6	34.0	29.8	26.4	23.8	21.6	19.8	17.0	14.8	13.2		
	50	0.894	C	53.2	44.2	38.0	33.2	29.6	26.6	24.2	22.2	19.0	16.6	14.8		
	60	0.980	C	58.2	48.4	41.6	36.4	32.4	29.0	26.4	24.2	20.8	18.2	16.2		
	60	1.058	M	62.8	52.4	45.0	39.2	35.0	31.4	28.6	26.2	22.4	19.6	17.4		
	70	1.058	M	62.8	52.4	45.0	39.2	35.0	31.4	28.6	26.2	22.4	19.6	17.4		
O5-Brown	20	0.708	C	42.0	35.0	30.0	26.2	23.4	21.0	19.0	17.6	15.0	13.2	11.6		
	30	0.866	C	51.4	42.8	36.8	32.2	28.6	25.8	23.4	21.4	18.4	16.0	14.2		
	40	1.000	C	59.4	49.6	42.4	37.2	33.0	29.8	27.0	24.8	21.2	18.6	16.6		
	50	1.118	C	66.4	55.4	47.4	41.6	36.8	33.2	30.2	27.6	23.8	20.8	18.4		
	60	1.224	C	72.8	60.6	52.0	45.4	40.4	36.4	33.0	30.4	26.0	22.8	20.2		
	60	1.322	C	78.6	65.4	56.2	49.2	43.6	39.2	35.8	32.8	28.0	24.6	21.8		
	70	1.322	C	78.6	65.4	56.2	49.2	43.6	39.2	35.8	32.8	28.0	24.6	21.8		

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

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





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) * 80
	100	* 80	50
	100	(50) 80	* 50
Flat spray nozzle size	from 0075 to 02		
	from 025 to 03 04 or bigger		



1st step is the top mounted suction filter, with a standard size of 30 mesh.



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

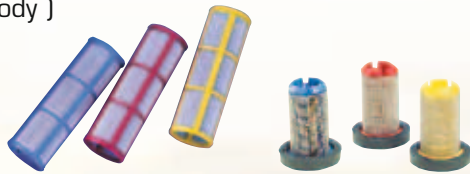


3rd step is the In-line filters (optional on some products). These filters reduce nozzle filter blockages and make filter cleaning quicker.



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

It is essential that the filters are chosen according to the nozzles used. HARDI® part 10423503 Nitril O-ring for HARDI® nozzles (Between Cap and Nozzle Body)



Mesh	30	50	80	100
inch	0.033	0.020	0.013	0.010

Fittings

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

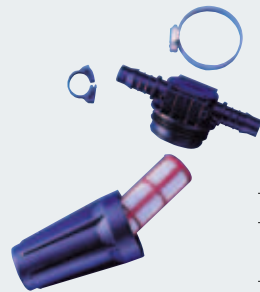
TRIPLET
No: 725078



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). Also can be used to mount Tee-Jet Tips to HARDI® Nozzle Bodies with o-ring 10423503. HARDI® part number 334685 (Black cap) fits round Tee-Jet nozzles and is used with o-ring 10423503. Both caps also can use the HARDI® nozzle screens.
 3 the 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	No.				
	1 pcs	1 pcs	1 pcs	1 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





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