



HYPRO[®] NOZZLES

CROP SPRAYING POCKET GUIDE 2017-18

Spray nozzles have been manufactured at Pentair's Cambridge, UK site for 60 years, initially under the Lurmark name and now the Hypro® brand.

Pentair is also the leading international producer of agricultural pumps sold under Hypro®, Shurflo® and Berkeley® brand names.

Hypro® spray nozzles, sprayer pumps and components are fitted by the world's premier manufacturers of spray equipment.

Pentair is a \$4.9 billion company with more than 50 manufacturing sites and 19,000 employees worldwide. Pentair offer a full range of flow management, filtration, thermal management and equipment protection solutions to a wide range of industries.



This booklet is designed as a quick reference to help you select nozzles that will achieve efficient and safe spraying. Because we are constantly improving our products and services, specifications may be subject to change from time to time.



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Working with Hypro Nozzles

BCPC SPRAY QUALITY

Droplet size is affected by nozzle flow rate, spraying pressure and the spray angle, the agro- chemical formulation that is being sprayed can also have an effect.

Generally smaller droplets result in improved spray coverage, especially of smaller targets. They can move laterally through the upper layers of a crop canopy, but are less likely to penetrate into a thicker crop. They will drift more though, resulting in spray landing where it is not intended.

Larger droplets will reduce spray drift, but there will be fewer droplets for a given spray volume (halving the droplet diameter results in 8 times fewer droplets). Heavier droplets are more likely to bounce off plant leaves, so spray coverage can be compromised. Increasing total water volume can help, but will reduce spraying efficiency, work rates and spraying timeliness.

For conventional hydraulic nozzles the 'quality' of the spray is defined by the Volume Median Diameter (VMD) which is the droplet size where half of the volume of spray is in larger droplets and half is

in smaller droplets.

The BCPC International Spray Classification System offers five spray quality categories: VERY FINE, FINE, MEDIUM, COARSE AND VERY COARSE, each category covers a range of VMDs:

FINE (VMD RANGE 150-200 μm)

Produce more droplets per unit area to enhance spray retention on the target. Suitable for contact acting fungicides and insecticides. There is a higher risk of spray drift with fine sprays.

MEDIUM (VMD RANGE 200-300 μm)

A mixed droplet spectrum ideal for most targets. The default option if no other spray quality is indicated.

COARSE (VMD RANGE 300-400 μm)

Use with residual / soil applied herbicides and where drift reduction is the priority, for example close to water.

DRIFT CLASSIFICATION SUMMARY FOR HYPRO NOZZLES

Hypro Nozzle	Drift Reduction*	015	02	025
Guardian AIR	> 75% (LERAP/JKI)	1.0 - 1.25 bar	1.0 - 1.25 bar	1.0 - 1.5 bar
Guardian AIR Twin	50%-75% (LERAP/JKI)	-	2.0 - 2.25 bar	2.0 - 2.25 bar
Ultra Low Drift	> 90% (JKI)	-	-	-
NEW 3D Nozzle	> 50% (LERAP)	-	-	Awaited

* Drift reduction at the pressures shown is indicated as a percentage compared to a standard flat fan nozzle and test pressure. In the UK, LERAP approved nozzles can reduce the buffer zones on some chemical labels.

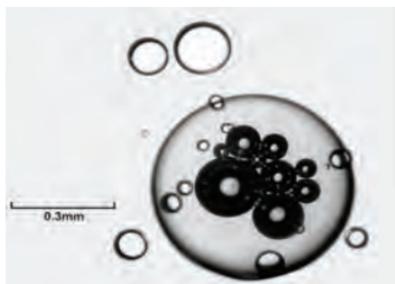
Spray manufacturers usually indicate the optimum BCPC spray quality on their product labels and in most cases this is a medium spray with a mixed droplet size spectrum. Where there is a BCPC spray quality classification for Hypro nozzles, it is indicated in the nozzle tables on pages 14-28.

AIR INDUCTION NOZZLES

BCPC spray quality is not defined for air induction nozzles because they have different physical properties when compared to fluid-only droplets.

Adding air means that the same amount of fluid makes more droplets, improving spray coverage. It also increases droplet size (VMD) but reduces weight. The lighter droplets travel more slowly, reducing impact and bounce off leaves.

Hypro's Guardian Air range has air-included droplets that are smaller than all others. As a result it can be recommended in place of conventional 'medium' spray quality on many targets, with the advantage drift reduction in the range of 50 to 75%.



By inclining the spray forward or backward droplets will also move laterally which is an advantage on some targets.

Air Induction and conventional nozzles are compared for different targets on pages 12 and 13 of this guide. More details can be found in the AHDB Nozzle Selection Chart at: <https://cereals.ahdb.org.uk/publications>.

Around Europe various authorities, including the UK's CRD (LERAP) and Germany's JKI, classify and approve spray nozzles for their drift reduction, some of these are shown below.

03	035	04	05	06	08
1.0 - 1.5 bar	1.0 - 1.5 bar	1.0 - 1.5 bar	1.0 - 1.5 bar	-	-
2.0 - 3.0 bar	2.0 - 2.5 bar	2.0 - 3.0 bar (25-50% reduction)	2.0 - 3.0 bar	2.0 - 3.0 bar	2.0 - 3.0 bar
2.5 - 3.0 bar (50% reduction)	N/A	2.5 - 3.0 bar	2.5 - 8.0 bar	-	-
1.0 bar	1.0 bar	1.0 bar	1.0 bar	Awaited	Awaited

IDENTIFYING WIND SPEED

The BCPC advises that wind speeds of 3.2 to 6.5 km/h (2 - 4 mph) are ideal for spraying. The table below explains how to judge wind speed. If conditions deteriorate and spraying has to stop, any spray that is left in the tank must be agitated and ideally regularly recirculated to prevent settling and blockages once spraying resumes.

Approximate air speed at boom height*	Beaufort scale	Description	Visible signs	Spraying	
Less than 2 km/h (Less than 1.2 mph)	Force 0	Calm		Smoke rises vertically	Only use medium or coarse spray quality
2 - 3.2 km/h (1.2 - 2 mph)	Force 1	Light air		Direction shown by smoke drift	Acceptable spraying conditions
3.2 - 6.5 km/h (2 - 4 mph)	Force 2	Light Breeze		Leaves rustle, wind felt on face	Ideal spraying conditions
6.5 - 9.6 km/h (4 - 6 mph)	Force 3	Gentle Breeze		Leaves and twigs in constant motion	Increased risk of spray drift. Take special care
9.6 - 14.5 km/h (6 - 9 mph)	Force 4	Moderate		Small branches moved, raises dust or loose paper	Spraying inadvisable

* Wind speed at typical boom heights is lower than Beaufort speeds which are measured at 10 metres.

FORWARD SPEED

Usual spraying speeds are limited to around 16km/h, higher speeds increase work rate but they also increase turbulence that may result in unacceptable spray drift and boom bounce that will affect the evenness of the spray pattern along the boom.

Once spraying speed has been chosen, select the nozzle size that delivers the required spray volume and spray quality using the tables on pages 14 - 28.

Add up the output of each nozzle at the planned spraying pressure to ensure there is enough capacity in the pump at the planned speed, allowing extra capacity for agitation.

With automatic rate controllers, a change in speed results in a change in pressure which consequently affects spray quality, so it is important to stick to the forward speed as much as possible once a nozzle has been chosen.



To calculate speed in km/h; divide 360 by the number of seconds it takes to travel 100 metres.

SELECTING SPRAY VOLUME RATE

Acceptable water rates can be found on the agrochemical product label (in litres of water per hectare) with recommended upper and lower limits.

Select a rate based on the spray coverage that is required, considering the target and the chemical mode of action; e.g. covering a dense canopy with a contact acting spray will require the higher end of the volume range. Generally when using larger droplets also keep towards the upper end of the volume guidelines and if in doubt use higher water volumes.

SPRAY PATTERNATION

Hypro flat fan nozzles are designed to be used on a spray boom such that each adjoining pattern overlaps to give even spray distribution along the boom.



Evenness of patternation can be assessed by spraying water onto an area of dry concrete. If it dries evenly, patternation is good, if not, adjust the boom height and repeat the test.

The boom height in the field should be set so that the pattern overlaps on the target (e.g. ground, weed, or crop). Always ensure that the boom does not go below the minimum single pattern overlap height, allowing for boom bounce.

Boom heights for different nozzle angles	110° Spray Angle at 50 cm nozzle spacing	80° Spray Angle at 50 cm nozzle spacing
Single pattern overlap (minimum)	35 cm	60 cm
Double pattern overlap	70 cm	120 cm
Recommended boom height	50 cm	75 cm

Always choose the lowest boom height to minimise spray drift.



Sprayer Calibration

Sprayers should be re-calibrated every 100 hectares (250 acres) of spraying. Check and clean all filters and ensure the pump feed and delivery lines are free of restrictions prior to calibration. To calibrate a sprayer, always use clean water only:

1. Using a calibrated measuring cylinder, measure the output from a minimum of four nozzles (at least one from each boom section) and compare it to the flow rates shown in the nozzle tables on pages 14-28.
2. If the output of these nozzles differs slightly from required, adjust the pressure until the correct rate is achieved at each nozzle. Ensure that a pressure change does not change the desired spray quality.
3. If the output of these nozzles differ by a large amount which cannot be compensated for by pressure, they are likely to be worn. All nozzles should then be replaced and the sprayer re-calibrated.
4. Any individual nozzle varying by more than 5% from the average, as well as nozzles showing uneven spray patterns should be replaced.



Nozzle calibration charts are intended only as an approximate guide to performance. Variation can occur, particularly with liquids of

varying viscosity and specific gravity, although this can be corrected for (see page 52). Pentair offers equipment that allows you to check the pressure and spray output at the nozzle (for details see page 38).

FILLING THE TANK

Agitation reduces as the tank fills up with water. Always fill the tank by one third before adding chemical to avoid excessive agitation and foaming. Avoid adding chemical to a full tank when agitation is at its lowest.



CONTAINER CLEANING

Always rinse containers out as they are emptied. This means that chemical residues end up in the tank for spraying and contaminated containers are not left around whilst you are in the field.

Selecting the right cleaning nozzle will ensure that containers are 100% clean, as well as saving time and water. Pentair offer a selection of nozzles designed for cleaning agrochemical containers (see page 33).

BLOCKED NOZZLES

Nozzle orifices are designed to a very high level of precision. Blocked nozzles should be cleared by soaking in water and cleaning with a soft brush and air line. NEVER blow through the nozzle orifice by mouth. Do not poke with wire or pins, as this will cause damage. At the end of spraying, nozzles should be removed, soaked, cleaned and re-fitted, especially where a different chemical is going to be sprayed next.

NOZZLE WEAR AND TEAR

Nozzles wear out in the course of normal use. This cannot be seen visually, so nozzles should be calibrated regularly. Keep one unused nozzle aside from each new set as a comparison. The whole set should be renewed when output has increased to more than 110% of the published flow rate.

Most Hypro nozzles are made out of polyacetal, an engineering polymer that meets the chemical and wear tolerance of agrochemical spraying at a reasonable cost. Typically, polyacetal nozzles should be changed every 1 or 2 seasons of use.

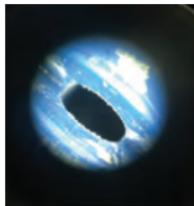
WHY DOES NOZZLE CONDITION MATTER?

A nozzle that is worn will apply more chemical than intended. For example a worn set of nozzles applying 10% extra to a winter wheat crop could cost on average up to £13/ha in extra chemical, easily enough to justify the cost of a replacing all the nozzles.

If the sprayer is fitted with an automatic rate controller, pressure will fall if nozzles are worn and this will affect the droplet size and spray quality. Uneven wear will also affect the spray pattern.

Nozzle problems are one of the main reasons that sprayers fail their tests under the UK National Sprayer Testing Scheme. In 2015-16 more than 27% of the 16,000 sprayers tested failed their tests for this reason.

Under the ISO 16122-2:2015 sprayer test protocol, nozzles must now be tested on all sprayers every 3 years.



Popular Nozzle Types

Hypro produces nozzles for almost every conceivable application, the following popular nozzle types cover many of the most common agricultural spraying requirements:



Guardian AIR™ 110° Air-induction Nozzles (see p14)

The air induction nozzle with the finest drops to optimise the balance between drift reduction and spray coverage. Suitable for a wide variety of applications to cereals, oilseed rape and other combinable crops. Effective down to 100 l/ha of water.



3 star at 1.25-1.5 bar



75% drift reduction



Guardian AIR Twin 110° Air-induction Nozzles (see p15)

Twin 30° forward and rearward inclines, based on the finer droplet spray quality of Guardian AIR. Ideal for ear sprays and penetrating into denser crop canopies.



2 star at 2-3 bar



Up to 50% drift reduction



Ultra Low Drift 120° Nozzles (see p16)

Significant reduction in drift from coarse air-filled droplets. Suitable for soil-active and translocated foliar sprays on larger targets.



90% drift reduction



NEW 3D 100° Nozzles (see p17)

An inclined spray that improves coverage of vertical targets such as soil clods and small grass weeds and gets spray into crop canopies. Eliminates the smallest droplets to reduce drift by 60-75%.



2 star at 1 bar



Hypro Flat Fan 110° & 80° Nozzles (see p18 and p20)

Versatile nozzle suitable for application of herbicides, fungicides, insecticides and growth regulators. Mixed droplet spectrum suitable for a wide range of targets.



Hypro Flat Fan VP 110° & 80° Nozzles (see p19 and p21)

Can be used over pressures of 1 to 5 bar. Ideal for use with automatic rate control systems. Mixed droplet spectrum suitable for a wide range of targets.



PoliJet (AN) and Deflectip (DT) Anvil 55° - 130° Nozzles (see p22)

Ideally suited to knapsack spraying. Designed with uniform distribution and to minimise nozzle blockage. A choice of spray angle options suitable for spraying different swath widths with a single nozzle.



Lo-Drift 110° Nozzles (see p23)

The original drift reducing nozzle that features a pre-orifice but no air induction. Spray is typically coarser than a conventional flat fan nozzle producing half the drift. Available in polyacetal or PVDF.



Evenspray 80° Nozzles (see p24)

Non-tapering spray pattern designed specifically for non-overlapping applications such as herbicide band spraying or use in knapsack sprayers.



Cone Spray SwirlTip Disc and Core 80° - 90° Nozzles (see p25)

Finely atomised droplets in hollow cone pattern, suitable for contact acting chemicals. Designed for band spraying or misting spray applications.



Hi-Flow Nozzles (see p26)

A wide angle nozzle that generates an extremely coarse spray, available in a range of high flow rates. Typically used to apply fertiliser and non-selective herbicide in tank mixture.



ESI Liquid Fertiliser Nozzles (see p27)

One of the most compact liquid fertiliser nozzles on the market. A unique jet array and stabilising diffuser creates 6 solid streams for excellent distribution of fertiliser and minimal crop scorch.



Hypro XT Nozzles for Boomless Spraying (see p28)

XT nozzles throw a very coarse spray in a swath up to 4.9 metres wide and can be used instead of a spray boom or to extend the spraying width. Ideal for use in forests, amenity or pastureland where there are obstructions to spraying.



Hypro TwinCap (see p29)

Accommodates two spray nozzles back-to-back in the same bayonet cap. Increase spray volume without coarsening spray quality and 30° inclines direct spray under crop canopies.



Hypro FulcoTip (FCX) 90° Nozzles (For details see www.hypro.pentair.com)

Full cone pattern. Suitable for spot spraying with knapsack sprayers. Medium to fine spray over 1-10 bar pressures. PART NUMBERS: 30FCX02 to 30FCX08.



Hypro HollowTip (HCX) 80° Nozzles (For details see www.hypro.pentair.com)

Hollow cone pattern with fine spray quality over 3-10 bar pressures. PART NUMBERS: 30HCX2 to 30HCX18.



Misting Nozzles (For details see www.hypro.pentair.com)

Extremely fine droplets and very low flow rates 0.03-0.6 l/min at up to 10 bar. Suitable for humidification and evaporative cooling applications such as in grain storage, livestock areas and glasshouses. AFD and HAF series.

All nozzles are designed to fit Hypro and other ISO standard caps. Nozzles are manufactured from polyacetal material as standard, other materials are also available. Threaded options are available for many nozzle types.

Nozzles for Targets

To get the best chemical performance at the key spray timings, it is essential to choose the nozzle that gives good target coverage considering both the spray quality and a suitable incline.

PRE-EMERGENCE HERBICIDES

Good coverage over soil clods helps prevent weed escape. The absence of a crop can exacerbate spray drift for these applications.



Recommended nozzles:



3D Nozzle: Optimised and proven for pre-emergence use. Suitable for 60 -75 cm boom heights. Alternate the spray forward and back at 2-3 bar for best results. Page 17.



Guardian AIR Twin: The best air induction nozzle option. Use when drift reduction is the priority. Twin 30° inclines give effective coverage of soil clods. Page 15.

POST EMERGENCE HERBICIDES FOR SMALL GRASS WEEDS

It is important to get enough spray onto the leaves of small grass weeds. An inclined spray is essential for hitting this target. Choose the water volume and pressure that gives a medium fine spray quality.



Recommended nozzle:



3D Nozzle: An inclined spray with the optimum droplet spectrum for coverage of small grass weeds. Alternate the spray forward and back at 2-3 bar for optimum coverage. Page 17.

LIQUID FERTILISER APPLICATION

Consistent application along the boom is essential. A compact nozzle fits onto a 3, 4 or 5 way nozzle body, making changing to a fertiliser nozzle straightforward and reducing the risk of accidental damage.



Recommended nozzle:



FastCap ESI: 6 jets are the optimum to achieve good fertiliser distribution whilst minimising the risk of outlet blockage. Stable streams help reduce the likelihood of crop scorch. Set at 50 cm above crop height. Page 27.

CEREAL FUNGICIDE IN TANK MIX WITH HERBICIDE/PGR

At this busy time of year minimising drift gives more spray days but this should not be at the expense of good spray coverage. A multi-purpose nozzle, effective at lower water volumes also helps workload.

Recommended nozzles:



Guardian AIR: A proven drift-reducing option. Excellent spray coverage at 3 bar and 100 l/ha water. Slight rear incline helps direct spray downwards to leaves, stem bases and weeds. Page 14



VP: Where a conventional flat fan spray is required, for example on smaller weeds, the VP includes a mixed droplet spectrum and holds its spray pattern down to 1 bar. Pages 19 and 21.



OILSEED RAPE AND PULSE FUNGICIDES AND DESICCANTS

Getting coverage into the canopy is important for these applications. Where timing is important, using a drift-reducing nozzle helps maximise spraying days, for example with protectant sclerotinia sprays.

Recommended nozzles:



Guardian AIR Twin: Twin 30° air inclusion sprays. Use at 3 bar to give an excellent balance of drift-reduction and spray coverage. Page 15.



3D Nozzle: Alternate the incline direction along the boom to improve spray distribution up and down the plant, the best choice for contact desiccants. Page 17.



EAR SPRAY FUNGICIDES

Good spray coverage over both sides of the ear is important for effective disease protection. Choose a drift-reducing nozzle to help widen the spraying window.



Recommended nozzles:

Guardian AIR Twin: Twin 30° air inclusion sprays cover the front and back of the ear. Maximise spray days by choosing 100 l/ha water. Use at 3 bar for optimum spray coverage or at 2 bar for 50-75% drift reduction. Page 15.



3D Nozzle: Alternate along the boom for '3D' coverage of the ear. Page 17.



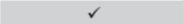
Nozzle Selection Through the Spraying Year

Nozzle suggestions are based on the categories published in the current UK AHDB Nozzle Selection Chart which can be found at: <https://cereals.ahdb.org.uk/publications>. Always refer to the product label or the latest application advice from the agrochemical manufacturer when selecting spray quality.

	CROP STAGE AND CHEMICAL TYPE	TARGET	APPLICATION CHALLENGE
AUTUMN	Soil acting pre or early post-emergence herbicides	Soil	Even coverage of soil clods
	Insecticides	Small OSR or cereal plants	Small target area
	Post-emergence herbicides	Small grasses (less than 3 leaves)	Small target area, weeds may be shaded
SPRING	Post-emergence herbicides	Grasses (more than 3 leaves)	Vertical target orientation
	Post-emergence herbicides	Broad-leaved weeds (up to 2 cm across)	Small target area, weeds may be shaded
	Post-emergence herbicides	Broad-leaved weeds (2 - 5 cm across)	Weeds may be shaded
	Post-emergence herbicides	Broad leaved weeds (more than 5 cm across)	Penetration into crop canopy
	Eyespot fungicides and plant growth regulators	Crop stem and lower leaves	Penetration to base of crop
	Cereal fungicides T0, T1, T2	Crop leaves and leaf axils	Penetration into crop canopy
	OSR foliar fungicides	Crop leaves	Coverage from top to base
SUMMER	Potato blight fungicides	Crop leaves and stems	Keep water rates up for good coverage
	Ear fungicides (T3) and aphicides	Crop ear	Contact action important
	Desiccation with contact acting herbicide	Crop leaves and stems	Keep water rates up for good spray coverage
	Glyphosate	Larger weeds and crop desiccation	Not over-wetting leaf

Guidelines for air induction nozzles are given for applications at 3 bar pressure and 10-16 kph. At these pressures finer air induction nozzles such as Guardian AIR typically reduce drift by 50%, whilst coarser air induction nozzles such as Ultra Low Drift typically reduce drift by more than 75%. For flat fan nozzles choose a pressure that gives a medium spray.

FLAT FAN		AIR INDUCTION		
MEDIUM		FINER		COARSER
				
VP	NEW 3D NOZZLE 37.5° INCLINE	GUARDIAN AIR 10-13° INCLINE	GUARDIAN AIR TWIN 30° INCLINES	ULTRA LOW DRIFT
✓	✓✓✓	✓	✓✓	✓
✓✓✓	✓✓✓	✓✓	✓✓	-
✓✓	✓✓✓	-	✓	-
✓✓	✓✓✓	✓✓	✓✓	-
✓✓✓	✓✓	✓	✓	-
✓✓✓	✓✓	✓✓	✓✓	-
✓✓✓	✓✓	✓✓✓	✓✓	-
✓✓✓	✓✓	✓✓✓	✓✓	-
✓✓✓	✓✓	✓✓✓	✓✓	✓
✓✓	✓✓✓	✓✓	✓✓✓	-
✓✓	✓✓✓	-	✓	-
✓✓	✓✓✓	✓✓	✓✓✓	-
✓✓	✓✓✓	✓	✓	-
✓✓	✓✓✓	✓✓	✓✓✓	✓✓

Best for efficacy  ✓✓✓ Urgent spraying only  ✓

Acceptable efficacy  ✓✓ Not suitable  -

Guardian AIR 110° Air-Induction Nozzles

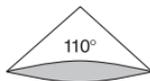
The air induction nozzle with the finest drops to optimise the balance between drift reduction and spray coverage even at 100 l/ha water. Suitable for a wide variety of applications to cereals, oilseed rape and other combinable crops. For optimum spray coverage use at 3 bar.



	PART NUMBER (REC FILTER MESH#)	PRESS. BAR	FLOW L/MIN	APPLICATION RATES L/HA AT KM/H						LERAP RATING
				8KPH	10KPH	12KPH	14KPH	16KPH	18KPH	
Green	GA110-015AZ (100#)	1.0	0.346	52	42	35	30	26	23	★★★ 1-1.25 bar
		2.0	0.490	73	59	49	42	37	33	
		3.0	0.600	90	72	60	51	45	40	
		4.0	0.693	104	83	69	59	52	46	
		5.0	0.775	116	93	77	66	58	52	
Yellow	GA110-02AZ (100#)	1.0	0.462	69	55	46	40	35	31	★★★ 1-1.25 bar
		2.0	0.653	98	78	65	56	49	44	
		3.0	0.800	120	96	80	69	60	53	
		4.0	0.924	139	111	92	79	69	62	
		5.0	1.033	155	124	103	89	77	69	
Lilac	GA110-025AZ (100#)	1.0	0.577	87	69	58	49	43	38	★★★ 1-1.5 bar
		2.0	0.816	122	98	82	70	61	54	
		3.0	1.000	150	120	100	86	75	67	
		4.0	1.155	173	139	115	99	87	77	
		5.0	1.291	194	155	129	111	97	86	
Blue	GA110-03AZ (100#)	1.0	0.693	104	83	69	59	52	46	★★★ 1-1.5 bar
		2.0	0.980	147	118	98	84	73	65	
		3.0	1.200	180	144	120	103	90	80	
		4.0	1.386	208	166	139	119	104	92	
		5.0	1.550	232	186	155	133	116	103	
Brown Red	GA110-035AZ (100#)	1.0	0.808	121	97	81	69	61	54	★★★ 1-1.5 bar
		2.0	1.143	171	137	114	98	86	76	
		3.0	1.400	210	168	140	120	105	93	
		4.0	1.616	242	194	162	139	121	108	
		5.0	1.807	271	217	181	155	136	120	
Red	GA110-04AZ (50#)	1.0	0.924	139	111	92	79	69	62	★★★ 1-1.5 bar
		2.0	1.306	196	157	131	112	98	87	
		3.0	1.600	240	192	160	137	120	107	
		4.0	1.848	277	222	185	158	139	123	
		5.0	2.066	310	248	207	177	155	138	
Brown	GA110-05AZ (50#)	1.0	1.155	173	139	115	99	87	77	★★★ 1-1.5 bar
		2.0	1.633	245	196	163	140	122	109	
		3.0	2.000	300	240	200	171	150	133	
		4.0	2.309	346	277	231	198	173	154	
		5.0	2.582	387	310	258	221	194	172	



75% drift reduction.



Spray quality is categorized as 'smaller droplet air induction' by AHDB at 3 bar and is similar across different nozzle sizes when used at the same pressure.

Application rates shown on this chart are based upon tests at 3 bar and 50cm nozzle spacing.

ORDERING: Use part numbers shown in column 2, also available as FastCap versions including cap and gasket; precede part number with FC-, e.g. FC-GA110-03AZ.

Guardian AIR Twin 110° Air-Induction Nozzles



Twin 30° forward and rearward inclines, based on the finer droplet spray quality of Guardian AIR. Ideal for ear sprays and penetration into denser crop canopies. Features an integral FastCap design. For optimum spray coverage use at 3 bar.

	PART NUMBER (REC FILTER MESH#)	PRESS. BAR	FLOW L/MIN	APPLICATION RATES L/HA AT KM/H						LERAP RATING
				8KPH	10KPH	12KPH	14KPH	16KPH	18KPH	
Yellow	GAT110-02A (100#)	2.0	0.653	98	78	65	56	49	44	★★ 2.0-2.25 bar
		3.0	0.800	120	96	80	69	60	53	
		4.0	0.924	139	111	92	79	69	62	
		5.0	1.033	155	124	103	89	77	69	
Lilac	GAT110-025A (100#)	2.0	0.816	122	98	82	70	61	54	★★ 2.0-2.25 bar
		3.0	1.000	150	120	100	86	75	67	
		4.0	1.155	173	139	115	99	87	77	
		5.0	1.291	194	155	129	111	97	86	
Blue	GAT110-03A (100#)	2.0	0.980	147	118	98	84	73	65	★★ ★★
		3.0	1.200	180	144	120	103	90	80	
		4.0	1.386	208	166	139	119	104	92	
		5.0	1.550	232	186	155	133	116	103	
Brown Red	GAT110-035A (100#)	2.0	1.143	171	137	114	98	86	76	★★ 2.0-2.5 bar
		3.0	1.400	210	168	140	120	105	93	
		4.0	1.616	242	194	162	139	121	108	
		5.0	1.807	271	217	181	155	136	120	
Red	GAT110-04A (50#)	2.0	1.306	196	157	131	112	98	87	★ ★
		3.0	1.600	240	192	160	137	120	107	
		4.0	1.848	277	222	185	158	139	123	
		5.0	2.066	310	248	207	177	155	138	
Brown	GAT110-05A (50#)	2.0	1.633	245	196	163	140	122	109	★★ ★★
		3.0	2.000	300	240	200	171	150	133	
		4.0	2.309	346	277	231	198	173	154	
		5.0	2.582	387	310	258	221	194	172	
Grey	GAT110-06A (50#)	2.0	1.960	294	235	196	168	147	131	★★ ★★
		3.0	2.400	360	288	240	206	180	160	
		4.0	2.771	416	333	277	238	208	185	
		5.0	3.098	465	372	310	266	232	207	
White	GAT110-08A (50#)	2.0	2.613	392	314	261	224	196	174	★★ ★★
		3.0	3.200	480	384	320	274	240	213	
		4.0	3.695	554	443	370	317	277	246	
		5.0	4.131	620	496	413	354	310	275	



2 Star 50-75% drift reduction



50% drift reduction.



Spray quality is categorized as 'smaller droplet air induction' by AHDB at 3 bar and is similar across different nozzle sizes when used at the same pressure.

Application rates shown in this chart are based on tests at 3 bar and 50 cm nozzle spacing.

ORDERING: Use part numbers shown in column 2. Also available as packs of 10, use part no. GAT110-0XPK10. Spare Seal 65-BS205, Spare Cage 30Q3579A, A filter can be used in place of the cage, see page 32.

Ultra Low Drift 120° Nozzles

Significant reduction in drift from coarse air-filled droplets. For spraying in the widest weather window. Suitable for soil-active and translocated foliar sprays on larger targets [e.g. glyphosate, cereal fungicides]. Avoid for smaller targets and contact acting chemicals. Replaces Drift Beta.



	PART NUMBER (REC FILTER MESH#)	PRESS. BAR	FLOW L/MIN	APPLICATION RATES L/HA AT KM/H					JKI RATING	
				8KPH	10KPH	12KPH	14KPH	16KPH		18KPH
Green	ULD120-015 (100#)	2.0	0.490	73	59	49	42	37	33	
		3.0	0.600	90	72	60	51	45	40	
		4.0	0.693	104	83	69	59	52	46	
		5.0	0.775	116	93	77	66	58	52	
Yellow	ULD120-02 (100#)	2.0	0.653	98	78	65	56	49	44	
		3.0	0.800	120	96	80	69	60	53	
		4.0	0.924	139	111	92	79	69	62	
		5.0	1.033	155	124	103	89	77	69	
Lilac	ULD120-025 (100#)	2.0	0.816	122	98	82	70	61	54	
		3.0	1.000	150	120	100	86	75	67	
		4.0	1.155	173	139	115	99	87	77	
		5.0	1.291	194	155	129	111	97	86	
Blue	ULD120-03 (100#)	2.0	0.980	147	118	98	84	73	65	50% 2.5-8 bar
		3.0	1.200	180	144	120	103	90	80	
		4.0	1.386	208	166	139	119	104	92	
		5.0	1.550	232	186	155	133	116	103	
Red	ULD120-04 (50#)	2.0	1.306	196	157	131	112	98	87	90% 2.5-3 bar
		3.0	1.600	240	192	160	137	120	107	
		4.0	1.848	277	222	185	158	139	123	
		5.0	2.066	310	248	207	177	155	138	
Brown	ULD120-05 (50#)	2.0	1.633	245	196	163	140	122	109	90% 2.5-8 bar
		3.0	2.000	300	240	200	171	150	133	
		4.0	2.309	346	277	231	198	173	154	
		5.0	2.582	387	310	258	221	194	172	
Grey	ULD120-06 (50#)	2.0	1.960	294	235	196	168	147	131	
		3.0	2.400	360	288	240	206	180	160	
		4.0	2.771	416	333	277	238	208	185	
		5.0	3.098	465	372	310	266	232	207	
White	ULD120-08 (50#)	2.0	2.613	392	314	261	224	196	174	
		3.0	3.200	480	384	320	274	240	213	
		4.0	3.695	554	443	370	317	277	246	
		5.0	4.131	620	496	413	354	310	275	



Up to 90% drift reduction.



Spray quality is categorized as 'larger droplet air induction' by AHDB at 3 bar.

Application rates shown on this chart are based upon tests at 3 bar and 50cm nozzle spacing.

ORDERING: Use part numbers shown in column 2.



An inclined spray that improves spray coverage on vertical targets such as soil clods and small grass weeds. Alternate spray direction along the boom. Eliminates the smallest droplets to reduce drift by 60-75%. 100° spray angle is viewed at right angle to the ground.

	PART NUMBER (REC FILTER MESH#)	PRESS. BAR	FLOW L/MIN	APPLICATION RATES L/HA AT KM/H						LERAP RATING
				8KPH	10KPH	12KPH	14KPH	16KPH	18KPH	
Yellow	3D100-02 (100#)	1.0	0.462	69	55	46	40	35	31	
		1.5	0.566	85	68	57	48	42	38	
		2.0	0.653	98	78	65	56	49	44	
		3.0	0.800	120	96	80	69	60	53	
Lilac	3D100-025 (100#)	1.0	0.577	87	69	58	49	43	38	Awaited
		1.5	0.707	106	85	71	61	53	47	
		2.0	0.816	122	98	82	70	61	54	
		3.0	1.000	150	120	100	86	75	67	
Blue	3D100-03 (100#)	1.0	0.693	104	83	69	59	52	46	**
		1.5	0.849	127	102	85	73	64	57	
		2.0	0.980	147	118	98	84	73	65	
		3.0	1.200	180	144	120	103	90	80	
Brown Red	3D100-035 (100#)	1.0	0.808	121	97	81	69	61	54	**
		1.5	0.990	148	119	99	85	74	66	
		2.0	1.143	171	137	114	98	86	76	
		3.0	1.400	210	168	140	120	105	93	
Red	3D100-04 (50#)	1.0	0.924	139	111	92	79	69	62	**
		1.5	1.131	170	136	113	97	85	75	
		2.0	1.306	196	157	131	112	98	87	
		3.0	1.600	240	192	160	137	120	107	
Brown	3D100-05 (50#)	1.0	1.155	173	139	115	99	87	77	**
		1.5	1.414	212	170	141	121	96	94	
		2.0	1.633	245	196	163	140	122	109	
		3.0	2.000	300	240	200	171	150	133	
Grey	3D100-06 (50#)	1.0	1.386	208	166	139	119	104	92	Awaited
		1.5	1.697	255	204	170	145	127	113	
		2.0	1.960	294	235	196	168	147	131	
		3.0	2.400	360	288	240	206	180	160	
White	3D100-08 (50#)	1.0	1.848	277	222	185	158	139	123	Awaited
		1.5	2.263	339	272	226	194	170	151	
		2.0	2.613	392	314	261	224	196	174	
		3.0	3.200	480	384	320	274	240	213	



2 Star 50-75% drift reduction

BCPC CODING

FINE

MEDIUM

COARSE

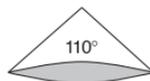
VERY COARSE

Application rates shown on this chart are based upon tests at 3 bar and 50cm nozzle spacing.



ORDERING: Use part numbers shown in column 2. Also available in 015 size.

To order 3D nozzle in the NEW Snaplock™ Fastcap, insert 'FC-' before part number shown, e.g. FC-3D100-03.



Hypro Flat Fan 110° Nozzles

Versatile nozzle suitable for the overall application of herbicides, fungicides, insecticides and growth regulators. Mixed droplet spectrum ensures effective spray coverage on a wide range of targets.



	PART NUMBER (REC FILTER MESH#)	PRESS. BAR	FLOW L/MIN	APPLICATION RATES L/HA AT KM/H						BCPC NOZZLE REF.
				8KPH	10KPH	12KPH	14KPH	16KPH	18KPH	
Orange	F110-01 (100#)	2.0	0.327	49	39	33	28	24	22	F110/0.4/3
		3.0	0.400	60	48	40	34	30	27	
		4.0	0.462	69	55	46	40	35	31	
Green	F110-015 (100#)	2.0	0.490	73	59	49	42	37	33	F110/0.6/3
		3.0	0.600	90	72	60	51	45	40	
		4.0	0.693	104	83	69	59	52	46	
Yellow	F110-02 (100#)	2.0	0.653	98	78	65	56	49	44	F110/0.8/3
		3.0	0.800	120	96	80	69	60	53	
		4.0	0.924	139	111	92	79	69	62	
Lilac	F110-025 (100#)	2.0	0.816	122	98	82	70	61	54	F110/1.0/3
		3.0	1.000	150	120	100	86	75	67	
		4.0	1.155	173	139	115	99	87	77	
Blue	F110-03 (100#)	2.0	0.980	147	118	98	84	73	65	F110/1.2/3
		3.0	1.200	180	144	120	103	90	80	
		4.0	1.386	208	166	139	119	104	92	
Red	F110-04 (50#)	2.0	1.306	196	157	131	112	98	87	F110/1.6/3
		3.0	1.600	240	192	160	137	120	107	
		4.0	1.848	277	222	185	158	139	123	
Brown	F110-05 (50#)	2.0	1.633	245	196	163	140	122	109	F110/2.0/3
		3.0	2.000	300	240	200	171	150	133	
		4.0	2.309	346	277	231	198	173	154	
Grey	F110-06 (50#)	2.0	1.960	294	235	196	168	147	131	F110/2.4/3
		3.0	2.400	360	288	240	206	180	160	
		4.0	2.771	416	333	277	238	208	185	
White	F110-08 (50#)	2.0	2.613	392	314	261	224	196	174	F110/3.2/3
		3.0	3.200	480	384	320	274	240	213	
		4.0	3.695	554	443	370	317	277	246	
Light Blue	F110-10 (30#)	2.0	3.266	490	392	327	280	245	218	F110/4.0/3
		3.0	4.000	600	480	400	343	300	267	
		4.0	4.619	693	554	462	396	346	308	
Light Green	F110-15 (30#)	2.0	4.899	735	588	490	420	367	327	F110/6.0/3
		3.0	6.000	900	720	600	514	450	400	
		4.0	6.928	1039	831	693	594	520	462	
Black	F110-20 (30#)	2.0	6.532	980	784	653	560	490	435	F110/8.0/3
		3.0	8.000	1200	960	800	686	600	533	
		4.0	9.238	1386	1109	924	792	693	616	

BCPC CODING

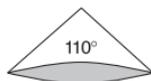
FINE

MEDIUM

COARSE

Application rates shown on this chart are based upon tests at 3 bar and 50cm nozzle spacing.

ORDERING: Use part numbers shown in column 2.



Hypro Flat Fan VP 110° Nozzles



Maintains spray angle over variable pressures of 1 to 5 bar. Ideal for use with automatic rate controllers. Mixed droplet spectrum ensures effective spray coverage on a wide range of targets.

PART NUMBER (REC FILTER MESH#)		PRESS. BAR	FLOW L/MIN	APPLICATION RATES L/H/A AT KM/H						BCPC NOZZLE REF.
				8KPH	10KPH	12KPH	14KPH	16KPH	18KPH	
Green	VP110-015 (100#)	1.0	0.346	52	42	35	30	26	23	F110/0.6/3
		2.0	0.490	73	59	49	42	37	33	
		3.0	0.600	90	72	60	51	45	40	
		4.0	0.693	104	83	69	59	52	46	
		5.0	0.775	116	93	77	66	58	52	
Yellow	VP110-02 (100#)	1.0	0.462	69	55	46	40	35	31	F110/0.8/3
		2.0	0.653	98	78	65	56	49	44	
		3.0	0.800	120	96	80	69	60	53	
		4.0	0.924	139	111	92	79	69	62	
		5.0	1.033	155	124	103	89	77	69	
Lilac	VP110-025 (100#)	1.0	0.577	87	69	58	49	43	38	F110/1.0/3
		2.0	0.816	122	98	82	70	61	54	
		3.0	1.000	150	120	100	86	75	67	
		4.0	1.155	173	139	115	99	87	77	
		5.0	1.291	194	155	129	111	97	86	
Blue	VP110-03 (100#)	1.0	0.693	104	83	69	59	52	46	F110/1.2/3
		2.0	0.980	147	118	98	84	73	65	
		3.0	1.200	180	144	120	103	90	80	
		4.0	1.386	208	166	139	119	104	92	
		5.0	1.549	232	186	155	133	116	103	
Brown Red	VP110-35 (50#)	1.0	0.808	121	97	81	69	61	54	F110/1.4/3
		2.0	1.143	171	137	114	98	86	76	
		3.0	1.400	210	168	140	120	105	93	
		4.0	1.616	242	194	162	139	121	108	
		5.0	1.807	271	217	181	155	136	120	
Red	VP110-04 (50#)	1.0	0.924	139	111	92	79	69	62	F110/1.6/3
		2.0	1.306	196	157	131	112	98	87	
		3.0	1.600	240	192	160	137	120	107	
		4.0	1.848	277	222	185	158	139	123	
		5.0	2.066	310	248	207	177	155	138	
Brown	VP110-05 (50#)	1.0	1.155	173	139	115	99	87	77	F110/2.0/3
		2.0	1.633	245	196	163	140	122	109	
		3.0	2.000	300	240	200	171	150	133	
		4.0	2.309	346	277	231	198	173	154	
		5.0	2.582	387	310	258	221	194	172	
Grey	VP110-06 (50#)	1.0	1.386	208	166	139	119	104	92	F110/2.4/3
		2.0	1.960	294	235	196	168	147	131	
		3.0	2.400	360	288	240	206	180	160	
		4.0	2.771	416	333	277	238	208	185	
		5.0	3.098	465	372	310	266	232	207	

BCPC CODING

FINE

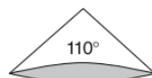
MEDIUM

COARSE

Also available in sizes: VP08, VP10, VP15.

Application rates shown on this chart are based upon tests at 3 bar and 50cm nozzle spacing.

ORDERING: Use part numbers shown in column 2.



Hypro Flat Fan 80° Nozzles

Versatile nozzle suitable for the overall application of herbicides, fungicides, insecticides and growth regulators. An 80° angle nozzle is ideal where the boom is 60-75 cm above the target. Slightly coarser spray quality than the 110° version of this nozzle.



	PART NUMBER (REC FILTER MESH#)	PRESS. BAR	FLOW L/MIN	APPLICATION RATES L/HA AT KM/H						BCPC NOZZLE CODE
				8KPH	10KPH	12KPH	14KPH	16KPH	18KPH	
Orange	F80-01 (100#)	2.0	0.327	49	39	33	28	24	22	F80/0.4/3
		3.0	0.400	60	48	40	34	30	27	
		4.0	0.462	69	55	46	40	35	31	
Green	F80-015 (100#)	2.0	0.490	73	59	49	42	37	33	F80/0.6/3
		3.0	0.600	90	72	60	51	45	40	
		4.0	0.693	104	83	69	59	52	46	
Yellow	F80-02 (100#)	2.0	0.653	98	78	65	56	49	44	F80/0.8/3
		3.0	0.800	120	96	80	69	60	53	
		4.0	0.924	139	111	92	79	69	62	
Lilac	F80-025 (100#)	2.0	0.816	122	98	82	70	61	54	F80/1.0/3
		3.0	1.000	150	120	100	86	75	67	
		4.0	1.155	173	139	115	99	87	77	
Blue	F80-03 (100#)	2.0	0.980	147	118	98	84	73	65	F80/1.2/3
		3.0	1.200	180	144	120	103	90	80	
		4.0	1.386	208	166	139	119	104	92	
Red	F80-04 (50#)	2.0	1.306	196	157	131	112	98	87	F80/1.6/3
		3.0	1.600	240	192	160	137	120	107	
		4.0	1.848	277	222	185	158	139	123	
Brown	F80-05 (50#)	2.0	1.633	245	196	163	140	122	109	F80/2.0/3
		3.0	2.000	300	240	200	171	150	133	
		4.0	2.309	346	277	231	198	173	154	
Grey	F80-06 (50#)	2.0	1.960	294	235	196	168	147	131	F80/2.4/3
		3.0	2.400	360	288	240	206	180	160	
		4.0	2.771	416	333	277	238	208	185	
White	F80-08 (50#)	2.0	2.613	392	314	261	224	196	174	F80/3.2/3
		3.0	3.200	480	384	320	274	240	213	
		4.0	3.695	554	443	370	317	277	246	
Light Blue	F80-10 (30#)	2.0	3.266	490	392	327	280	245	218	F80/4.0/3
		3.0	4.000	600	480	400	343	300	267	
		4.0	4.619	693	554	462	396	346	308	
Light Green	F80-15 (30#)	2.0	4.899	735	588	490	420	367	327	F80/6.0/3
		3.0	6.000	900	720	600	514	450	400	
		4.0	6.928	1039	831	693	594	520	462	
Black	F80-20 (30#)	2.0	6.532	980	784	653	560	490	435	F80/8.0/3
		3.0	8.000	1200	960	800	686	600	533	
		4.0	9.238	1386	1109	924	792	693	616	

BCPC CODING

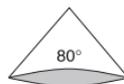
FINE

MEDIUM

COARSE

Application rates shown on this chart are based upon tests at 3 bar and 50cm nozzle spacing.

ORDERING: Use part numbers shown in column 2.



Hypro Flat Fan VP 80° Nozzles



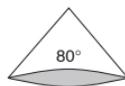
Maintains spray angle over variable pressures of 1 to 5 bar. Ideal for use with automatic rate controllers. An 80° angle nozzle is ideal where the boom is 60-75 cm above the target. Slightly coarser spray quality than the 110° nozzle version of this nozzle.

	PART NUMBER (REC FILTER MESH#)	PRESS. BAR	FLOW L/MIN	APPLICATION RATES L/HA AT KM/H						BCPC NOZZLE REF.
				8KPH	10KPH	12KPH	14KPH	16KPH	18KPH	
Green	VP80-015 (100#)	1.0	0.346	52	42	35	30	26	23	F110/0.6/3
		2.0	0.490	73	59	49	42	37	33	
		3.0	0.600	90	72	60	51	45	40	
		4.0	0.693	104	83	69	59	52	46	
		5.0	0.775	116	93	77	66	58	52	
Yellow	VP80-02 (100#)	1.0	0.462	69	55	46	40	35	31	F110/0.8/3
		2.0	0.653	98	78	65	56	49	44	
		3.0	0.800	120	96	80	69	60	53	
		4.0	0.924	139	111	92	79	69	62	
		5.0	1.033	155	124	103	89	77	69	
Blue	VP80-03 (100#)	1.0	0.693	104	83	69	59	52	46	F110/1.2/3
		2.0	0.980	147	118	98	84	73	65	
		3.0	1.200	180	144	120	103	90	80	
		4.0	1.386	208	166	139	119	104	92	
		5.0	1.549	232	186	155	133	116	103	
Red	VP80-04 (50#)	1.0	0.924	139	111	92	79	69	62	F110/1.6/3
		2.0	1.306	196	157	131	112	98	87	
		3.0	1.600	240	192	160	137	120	107	
		4.0	1.848	277	222	185	158	139	123	
		5.0	2.066	310	248	207	177	155	138	
Brown	VP80-05 (50#)	1.0	1.155	173	139	115	99	87	77	F110/2.0/3
		2.0	1.633	245	196	163	140	122	109	
		3.0	2.000	300	240	200	171	150	133	
		4.0	2.309	346	277	231	198	173	154	
		5.0	2.582	387	310	258	221	194	172	
Grey	VP80-06 (50#)	1.0	1.386	208	166	139	119	104	92	F110/2.4/3
		2.0	1.960	294	235	196	168	147	131	
		3.0	2.400	360	288	240	206	180	160	
		4.0	2.771	416	333	277	238	208	185	
		5.0	3.098	465	372	310	266	232	207	

BCPC CODING FINE MEDIUM COARSE

Application rates shown on this chart are based upon tests at 3 bar and 50cm nozzle spacing.

ORDERING: Use part numbers shown in column 2.



Polijet (AN) and Deflectip (DT) Anvil Nozzles

Ideally suited to knapsack sprayer applications. The AN (Polijet) range offers similar application rates at a choice of spray widths. Designed with uniform distribution and to minimise nozzle blockage. Application rates are shown at different walking speeds and typical knapsack spraying pressures, assuming the nozzle is 40 cm above the target.



POLIJET PART NUMBER (REC FILTER MESH#)		SPRAY ANGLE	SPRAY WIDTH (40CM HEIGHT)	PRESS. BAR	FLOW L/MIN	SINGLE NOZZLE APPLICATION RATES L/HA AT KM/H				BCPC NOZZLE REF.
						2KPH	3KPH	4KPH	5KPH	
Yellow	30AN0.6 (100#)	53°	0.40m	1.0	0.60	450	300	225	180	D/0.6/1
		63°	0.49m	1.5	0.73	450	300	225	180	
		71°	0.57m	2.0	0.85	450	300	225	180	
Green	30AN1.2 (50#)	90°	0.80m	1.0	1.20	450	300	225	180	D/1.2/1
		96°	0.89m	1.5	1.47	495	330	247	198	
		102°	0.98m	2.0	1.70	517	345	259	207	
Blue	30AN1.8 (50#)	113°	1.20m	1.0	1.80	449	300	225	180	D/1.8/1
		117°	1.30m	1.5	2.20	511	340	255	204	
		121°	1.41m	2.0	2.55	540	360	270	216	
Red	30AN2.4 (50#)	127°	1.60m	1.0	2.40	450	300	225	180	D/2.4/1
		131°	1.76m	1.5	2.94	502	335	251	201	
		136°	2.00m	2.0	3.39	510	340	255	204	

DEFLECTIP PART NUMBER (REC FILTER MESH#)		SPRAY ANGLE	SPRAY WIDTH (40CM HEIGHT)	PRESS. BAR	FLOW L/MIN	SINGLE NOZZLE APPLICATION RATES L/HA AT KM/H				BCPC NOZZLE REF.
						2KPH	3KPH	4KPH	5KPH	
Orange	30DT0.5 (100#)	72°	0.58m	1.0	0.23	118	78	59	47	D/0.23/1
		82°	0.70m	1.5	0.28	120	80	60	48	
		89°	0.79m	2.0	0.32	123	82	62	49	
Green	30DT0.75 (100#)	85°	0.73m	1.0	0.34	140	93	70	56	D/0.34/1
		93°	0.84m	1.5	0.42	149	99	75	60	
		100°	0.95m	2.0	0.48	152	101	76	61	
Yellow	30DT1.0 (100#)	100°	0.95m	1.0	0.46	143	96	72	57	D/0.46/1
		108°	1.10m	1.5	0.56	152	101	76	61	
		112°	1.19m	2.0	0.64	163	109	82	65	
Blue	30DT1.5 (100#)	105°	1.04m	1.0	0.68	197	131	98	79	D/0.68/1
		111°	1.16m	1.5	0.84	216	144	108	86	
		114°	1.23m	2.0	0.97	236	157	118	94	
Red	30DT2.0 (50#)	99°	0.94m	1.0	0.91	292	195	146	117	D/0.91/1
		105°	1.04m	1.5	1.12	321	214	161	129	
		110°	1.14m	2.0	1.29	339	226	169	135	
Brown	30DT2.5 (50#)	112°	1.19m	1.0	1.14	288	192	144	115	D/1.14/1
		115°	1.26m	1.5	1.40	333	222	167	133	
		119°	1.36m	2.0	1.61	356	237	178	142	
Grey	30DT3.0 (50#)	110°	1.14m	1.0	1.37	359	239	180	144	D/1.37/1
		114°	1.23m	1.5	1.68	408	272	204	163	
		116°	1.28m	2.0	1.93	453	302	227	181	

BCPC CODING

FINE MEDIUM COARSE

Application rates given refer to single nozzle application at 40 cm above the target.

ORDERING: Use part number shown in column 2. DeflecTip nozzles suitable for tractor spraying speeds are also available in sizes: DT4.0, DT5.0, DT7.5, DT10, DT15 & DT20.



Lo-Drift 110° Nozzles



The original drift reducing nozzle that features a pre-orifice but no air induction. Spray is typically coarser than a conventional flat fan nozzle, producing half the drift. Available in polyacetal or PVDF (sizes 03, 04, 05, 06).

	PART NUMBER (REC FILTER MESH#)	PRESS. BAR	FLOW L/MIN	APPLICATION RATES L/HA AT KM/H						BCPC NOZZLE REF.
				8KPH	10KPH	12KPH	14KPH	16KPH	18KPH	
Green	LD110-015 (100#)	2.0	0.490	73	59	49	42	37	33	FRD110/0.6/3
		3.0	0.600	90	72	60	51	45	40	
		4.0	0.693	104	83	69	59	52	46	
Yellow	LD110-02 (100#)	2.0	0.653	98	78	65	56	49	44	FRD110/0.8/3
		3.0	0.800	120	96	80	69	60	53	
		4.0	0.924	139	111	92	79	69	62	
Lilac	LD110-025 (100#)	2.0	0.816	122	98	82	70	61	54	FRD110/1.0/3
		3.0	1.000	150	120	100	86	75	67	
		4.0	1.155	173	139	115	99	87	77	
Blue	LD110-03 (100#)	2.0	0.980	147	118	98	84	73	65	FRD110/1.2/3
		3.0	1.200	180	144	120	103	90	80	
		4.0	1.386	208	166	139	119	104	92	
Red	LD110-04 (50#)	2.0	1.306	196	157	131	112	98	87	FRD110/1.6/3
		3.0	1.600	240	192	160	137	120	107	
		4.0	1.848	277	222	185	158	139	123	
Brown	LD110-05 (50#)	2.0	1.633	245	196	163	140	122	109	FRD110/2.0/3
		3.0	2.000	300	240	200	171	150	133	
		4.0	2.309	346	277	231	198	173	154	
Grey	LD110-06 (50#)	2.0	1.960	294	235	196	168	147	131	FRD110/2.4/3  at 2-3 bar
		3.0	2.400	360	288	240	206	180	160	
		4.0	2.771	416	333	277	238	208	185	
White	LD110-08 (50#)	2.0	2.613	392	314	261	224	196	174	FRD110/3.2/3
		3.0	3.200	480	384	320	274	240	213	
		4.0	3.695	554	443	370	317	277	246	

BCPC CODING

FINE

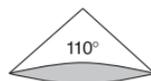
MEDIUM

COARSE

Application rates shown on this chart are based upon tests at 3 bar and 50cm nozzle spacing.

ORDERING: Use part numbers shown in column 2.

Sizes 03, 04, 05 and 06 are also available in PVDF, precede part number by '90-' e.g.90-LD03F110.



Hypro EvenSpray 80° Nozzles

Ideal for use with knapsack sprayers, the speeds and application rates shown here are for single nozzle applications at walking speeds. This nozzle can also be used for band spraying (see calculation on page 52 to determine nozzle size that is required).



	PART NO. (REC FILTER MESH#)	SPRAY WIDTH* (50 CM HEIGHT)	PRESS. BAR	FLOW L/MIN	SINGLE NOZZLE APPLICATION RATES L/HA AT KM/H				BCPC NOZZLE REF.
					2KPH	3KPH	4KPH	5KPH	
Orange	E80-01 (100#)	0.84m	2.0	0.327	117	78	58	47	FE80/0.4/3
			3.0	0.400	143	95	71	57	
			4.0	0.462	165	110	82	66	
Green	E80-015 (100#)	0.84m	2.0	0.490	175	117	87	70	FE80/0.6/3
			3.0	0.600	214	143	107	86	
			4.0	0.693	247	165	124	99	
Yellow	E80-02 (100#)	0.84m	2.0	0.653	233	156	117	93	FE80/0.8/3
			3.0	0.800	286	190	143	114	
			4.0	0.924	330	220	165	132	
Blue	E80-03 (100#)	0.84m	2.0	0.980	350	233	175	140	FE80/1.2/3
			3.0	1.200	429	286	214	171	
			4.0	1.386	495	330	247	198	
Red	E80-04 (50#)	0.84m	2.0	1.306	467	311	233	187	FE80/1.6/3
			3.0	1.600	571	381	286	229	
			4.0	1.848	660	440	330	264	
Brown	E80-05 (50#)	0.8m	2.0	1.633	583	389	292	233	FE80/2.0/3
			3.0	2.000	714	476	357	286	
			4.0	2.309	825	550	412	330	
Grey	E80-06 (50#)	0.84m	2.0	1.960	700	467	350	280	FE80/2.4/3
			3.0	2.400	857	571	429	343	
			4.0	2.771	990	660	495	396	
White	E80-08 (50#)	0.84m	2.0	2.613	933	622	467	373	FE80/3.2/3
			3.0	3.200	1143	762	571	457	
			4.0	3.698	1320	880	660	528	

BCPC CODING

FINE

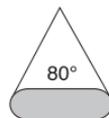
MEDIUM

COARSE

*Spray angle and widths given are at 3 bar

Application rates will vary with pressure and nozzle height above target. The application rates in this chart are based upon tests at 3 bar and 50 cm nozzle height.

ORDERING: Use part numbers as shown in column 2.



Hollow Cone Disc and Core 80° - 90° Nozzles



Finely atomised droplets in hollow cone pattern, suitable for contact acting chemicals. Designed for band spraying or mist sprayers at higher pressure.

DISC	CORE	PART NUMBERS (SPRAY ANGLE)	PRESS. BAR	FLOW L/MIN	APPLICATION RATES L/HA AT KM/H			BCPC NOZZLE REF.
					8KPH	10KPH	12KPH	
		30-DC-04 30-CR-13 (80°)	3	0.47	56	47	35	HC/0.47/3
			4	0.54	65	54	41	
			5	0.61	73	61	46	
		30-DC-04 30-CR-23 (80°)	3	0.59	71	59	44	HC/0.59/3
			4	0.68	82	68	51	
			5	0.76	91	76	57	
		30-DC-05 30-CR-23 (90°)	3	0.71	85	71	53	HC/0.71/3
			4	0.82	98	82	62	
			5	0.92	110	92	69	
		30-DC-06 30-CR-23 (90°)	3	0.83	100	83	62	HC/0.83/3
			4	0.96	115	96	72	
			5	1.07	129	107	80	
		30-DC-05 30-CR-25 (80°)	3	1.38	166	138	104	HC/1.38/3
			4	1.59	191	159	119	
			5	1.78	214	178	134	
		30-DC-06 30-CR-25 (85°)	3	1.74	209	174	131	HC/1.74/3
			4	2.00	240	200	150	
			5	2.24	269	224	168	
		30-DC-07 30-CR-25 (90°)	3	2.05	246	205	154	HC/2.05/3
			4	2.37	284	237	178	
			5	2.65	318	265	199	
		30-DC-06 30-CR-45 (95°)	3	2.29	275	229	181	HC/2.29/3
			4	2.64	317	264	198	
			5	2.96	355	296	222	
		30-DC-08 30-CR-25 (80°)	3	2.41	289	241	181	HC/2.41/3
			4	2.78	334	278	209	
			5	3.11	373	311	233	
		30-DC-07 30-CR-45 (85°)	3	2.68	322	268	201	HC/2.68/3
			4	3.10	371	310	232	
			5	3.46	415	346	260	
		30-DC-08 30-CR-45 (90°)	3	3.32	398	332	249	HC/3.32/3
			4	3.83	460	383	287	
			5	4.29	514	492	321	

BCPC CODING

FINE **MEDIUM** **COARSE**

Application rates shown on this chart are based on tests at 3 bar and 50cm nozzle spacing.

ORDERING: Both disc and core are required. Use part numbers shown in column 2.



Hi-Flow 140° Nozzles

A wide angle nozzle that generates an extremely coarse spray, available in a range of high flow rates. Typically used to apply fertiliser and non-selective herbicide in tank mixture.



	PART NUMBER (REC FILTER MESH#)	PRESS. BAR	FLOW L/MIN	APPLICATION RATES L/HA AT KM/H						
				8KPH	10KPH	12KPH	14KPH	16KPH	18KPH	20KPH
White	HF140-08 (50#)	1.5	2.263	339	271	226	194	170	151	136
		2	2.613	392	313	261	224	196	174	157
		3	3.200	480	384	320	274	240	213	192
		4	3.695	555	444	370	317	277	246	222
		5	4.131	620	496	413	354	310	275	248
Light Blue	HF140-10 (30#)	1.5	2.828	420	336	280	242	212	189	170
		2	3.266	495	396	330	280	245	218	196
		3	4.000	600	480	400	343	300	267	240
		4	4.619	690	552	460	396	346	308	277
		5	5.164	780	624	520	443	387	344	310
Light Green	HF140-15 (30#)	1.5	4.243	630	504	420	364	318	283	255
		2	4.899	735	588	490	420	367	327	294
		3	6.000	900	720	600	514	450	400	360
		4	6.928	1035	828	690	594	520	462	416
		5	7.746	1155	924	770	664	581	516	465
Black	HF140-20 (30#)	1.5	5.657	855	684	570	485	424	377	339
		2	6.532	975	780	650	560	490	435	392
		3	8.000	1200	960	800	686	600	533	480
		4	9.238	1380	1104	920	792	693	616	554
		5	10.328	1545	1236	1030	885	775	689	620
Beige	HF140-30	1.5	8.485	1275	1020	850	727	636	566	509
		2	9.798	1470	1176	980	840	735	653	588
		3	12.000	1800	1440	1200	1029	900	800	720
		4	13.856	2085	1668	1390	1188	1039	924	831
		5	15.492	2325	1860	1550	1328	1162	1033	930
White	HF140-40	1.5	11.314	1695	1356	1130	970	849	754	679
		2	13.064	1965	1572	1310	1120	980	871	784
		3	16.000	2400	1920	1600	1371	1200	1067	960
		4	18.475	2775	2220	1850	1584	1386	1232	1109
		5	20.656	3105	2484	2070	1771	1549	1377	1239
Purple	HF140-50	1.5	14.142	2115	1692	1410	1212	1061	943	849
		2	16.330	2445	1956	1630	1400	1225	1089	980
		3	20.000	3000	2400	2000	1714	1500	1333	1200
		4	23.094	3465	2772	2310	1979	1732	1540	1386
		5	25.820	3870	3096	2580	2213	1936	1721	1549
Yellow	HF140-60	1.5	16.971	2550	2040	1700	1455	1273	1131	1018
		2	19.596	2940	2352	1960	1680	1470	1306	1176
		3	24.000	3600	2880	2400	2057	1800	1600	1440
		4	27.713	4155	3324	2770	2375	2078	1848	1663
		5	30.984	4650	3720	3100	2656	2324	2066	1859

BCPC CODING

VERY COARSE

Application rates shown on this chart are based upon tests at 3 bar and 50cm nozzle spacing.

ORDERING: Use part numbers shown in column 2.



ESI Liquid Fertiliser Nozzles



One of the most compact liquid fertilizer nozzles on the market. A unique jet array and stabilising diffuser creates 6 solid streams for excellent distribution of fertilizer and minimal crop scorch. Incorporates a nozzle filter.

	PART NUMBER	PRESS. BAR	FLOW L/MIN	8KPH	10KPH	12KPH	14KPH	16KPH	18KPH
Green	FC-ESI-110015P	1.0	0.346	52	42	35	30	26	23
		2.0	0.490	73	59	49	42	37	33
		3.0	0.600	90	72	60	51	45	40
		4.0	0.693	104	83	69	59	52	46
Yellow	FC-ESI-11002P	1.0	0.462	69	55	46	40	35	31
		2.0	0.653	98	78	65	56	49	44
		3.0	0.800	120	96	80	69	60	53
		4.0	0.924	139	111	92	79	69	62
Blue	FC-ESI-11003P	1.0	0.693	104	83	69	59	52	46
		2.0	0.980	147	118	98	84	73	65
		3.0	1.200	180	144	120	103	90	80
		4.0	1.386	208	166	139	119	104	92
Red	FC-ESI-11004P	1.0	0.924	139	111	92	79	69	62
		2.0	1.306	196	157	131	112	98	87
		3.0	1.600	240	192	160	137	120	107
		4.0	1.848	277	222	185	158	139	123
Brown	FC-ESI-11005P	1.0	1.155	173	139	115	99	87	77
		2.0	1.633	245	196	163	140	122	109
		3.0	2.000	300	240	200	171	150	133
		4.0	2.309	346	277	231	198	173	154
Grey	FC-ESI-11006P	1.0	1.386	208	166	139	119	104	92
		2.0	1.960	294	235	196	168	147	131
		3.0	2.400	360	288	240	206	180	160
		4.0	2.771	416	333	277	238	208	185
White	FC-ESI-11008	1.0	1.848	277	222	185	158	139	123
		2.0	2.613	392	314	261	224	196	174
		3.0	3.200	480	384	320	274	240	213
		4.0	3.695	554	443	370	317	277	246
Light Blue	FC-ESI-11010	1.0	2.309	346	277	331	198	173	154
		2.0	3.266	490	392	327	280	245	218
		3.0	4.000	600	480	400	343	300	267
		4.0	4.619	693	554	462	396	346	308
Light Green	FC-ESI-11015	1.0	3.464	520	416	346	297	260	231
		2.0	4.899	735	588	490	420	367	327
		3.0	6.000	900	720	600	514	450	400
		4.0	6.928	1039	831	693	594	520	462
Black	FC-ESI-11020P	1.0	4.620	690	550	460	400	350	310
		2.0	6.532	980	784	653	560	490	435
		3.0	8.000	1200	960	800	686	600	533
		4.0	9.238	1386	1109	924	792	693	616

Application rates shown in this chart are based on tests at 3 bar, 50cm nozzle spacing and 50cm boom height. Flow rates are based on water, for liquids with different specific gravity use the instructions on page 52 to help select the correct nozzle size.

ORDERING: Use part numbers shown in column 2. Packs of 6 also available, add 'H' in front of 'ESI', e.g. FC-HESI-11008. Replacement seal part number: 65-BS205.



Hypro XT Nozzles for Boomless Spraying

XT nozzles throw a very coarse spray in a swath up to 4.9 metres wide and can be used instead of a spray boom or to extend the spraying width. Ideal for use in forests, amenity or pastureland where there are obstructions to spraying. Available with threaded stainless steel body or polyacetal FastCap bayonet (sizes 010 to 043).



	PART NUMBER	BAR	L/MIN	APPLICATION RATES L/HA AT KM/H												SPRAY WIDTH (M) @3BAR	XT THREAD NPT
				4	5	6	7	8	10	12	14	16	18	20			
Green	XT010 & FC-XT010	2	3.2	124	99	83	71	62	50	41	35	31	28	25	3.9	1/4"	
		3	3.9	152	121	101	87	76	61	51	43	38	34	30			
		4	4.6	175	140	117	100	88	70	58	50	44	39	35			
Light Green	FC-XT015	2	4.8	168	134	112	96	84	67	56	48	42	37	34	4.3	1/4"	
		3	5.9	206	165	137	118	103	82	69	59	51	46	41			
		4	6.8	238	190	158	136	119	95	79	68	59	53	48			
Blue	XT020 & FC-XT020	2	6.4	201	161	134	115	101	81	67	58	50	45	40	4.8	1/4"	
		3	7.9	247	197	165	141	123	99	82	71	62	55	49			
		4	9.1	265	228	190	163	142	114	95	81	71	63	57			
Yellow	XT024 & FC-XT024	2	7.7	237	189	158	135	118	95	79	68	59	53	47	4.9	1/4"	
		3	9.5	290	232	193	166	145	116	97	83	73	64	58			
		4	10.9	335	268	223	191	167	134	112	96	84	74	67			
Orange	XT043 & FC-XT043	2	13.9	473	378	315	270	236	189	158	135	118	105	95	4.4	3/8"	
		3	17.0	579	463	386	331	289	232	193	165	145	129	116			
		4	19.6	668	535	446	382	334	267	223	191	167	149	134			
Red	XT080	2	25.8	992	793	661	567	496	397	331	283	248	220	198	3.9	1/2"	
		3	31.6	1215	972	810	694	607	486	405	347	304	270	243			
		4	36.5	1403	1122	935	802	701	561	468	401	351	312	281			
White	XT167	2	53.8	1878	1502	1252	1073	939	751	626	537	469	417	376	4.3	3/4"	
		3	65.9	2300	1840	1533	1314	1150	920	767	657	575	511	460			
		4	76.1	2656	2125	1771	1518	1328	1062	885	759	664	590	531			
Grey	XT215	2	69.3	2122	1697	1414	1212	1061	849	707	606	530	471	424	4.9	3/4"	
		3	84.9	2598	2079	1732	1485	1299	1039	866	742	650	577	520			
		4	98.0	3000	2400	2000	1715	1500	1200	1000	857	750	667	600			

Application rates are based on the swath widths listed at boom height 1.2m. Swath width can be altered by adjusting nozzle angle by +/- 18°. If using a different swath width:

$$l/\text{min} = \frac{l/\text{ha} \times \text{km/hr} \times \text{swath width (m)}}{600}$$

$$l/\text{ha} = \frac{l/\text{min} \times 600}{\text{km/hr} \times \text{swath width (m)}}$$



ORDERING - Use part numbers shown (FC = Fastcap Option).

Swivel holder available (part no: I5Q3570A). Giokit repair kit for stainless steel nozzle is available (pattern generator, flow insert and internal O-ring), use part number followed by 'G' e.g. XT010G. Flow rates are based on water, allowance must be made for liquids of different viscosity and specific gravity, (e.g. liquid fertiliser). For calculation see page 52.

BAYONET FASTCAPS

For use with EF3 nozzle bodies.



	Flat Fan: GA, ULD, 3D, LD, VP, F, E			Cone: FCX, HCX, Disc & Core	
	No Seal	No Seal	NEW Snaplock™	No Seal	With Seal
Orange	150R2606	CAP00-01	-	150R2604	CAP04-01
Green	15RG2606	CAP00-015	CAP11-015*	15RG2604	CAP04-015
Yellow	15YE2606	CAP00-02	CAP11-02*	15YE2604	CAP04-02
Lilac	15LL2606	CAP00-025	CAP11-025*	15LL2604	CAP04-025
Blue	15UB2606	CAP00-03	CAP11-03*	15UB2604	CAP04-03
Brown Red	15RB2606	CAP00-035	CAP11-035*	-	-
Red	15RE2606	CAP00-04	CAP11-04*	15RE2604	CAP04-04
Brown	15LB2606	CAP00-05	CAP11-05*	15LB2604	CAP04-05
Grey	15GY2606	CAP00-06	CAP11-06*	15GR2604	CAP04-06
White	15WH2606	CAP00-08	CAP11-08*	15WH2604	CAP04-08
Light Blue	15CB2606	CAP00-10	-	15CB2604	CAP04-10
Light Green	15LG2606	CAP00-15	-	15LG2604	CAP04-15
Black	15BL2606	CAP00-20	-	15BL2604	CAP04-20

* Bag of 10 Seal part numbers: 2270-0150 (EPDM), 22W11MF64V (Viton).

Other Caps and Cap Accessories	Part Number
NEW Bayonet extender, with seal	CAP-EXT
Fastcap - DT (no offset) & seal (black)	CAP30-20
FastCap - Albus standard fan (black)	30Q2603-20
FastCap - Hardi (black)	16842490
Seal for Hardi cap	16842491
Twincap - Acetal	152607TC
Twincap - Acetal, one exit blanked	VPCTAP
Blanking insert for Twincap	30Q3834
Twincap - PDVF, acid resistant	15Q2530TC
Twincap - for Hardi bodies	16Q2530TC
Cap adaptor - Hardi bodies (10 pack)	9950-0024
Cap adaptor - Jacto bodies (10 pack)	9950-0027

NEW SNAPLOCK™ CAP

Easy twist, colour coded. Fits standard EF3 nozzle bodies. Packs include seals.



NEW BAYONET EXTENDER

Extends the bayonet stem by 28 mm to avoid spraying onto boom components.



CAP ADAPTORS

For Hardi or Jacto nozzle bodies. Packs include seals.



TWIN CAP

Inclines two nozzles by 30°. Polyacetal, PVDF and Hardi versions available.



Nozzle Holders & Nozzle Valves

A choice of turret styles that can accommodate from 1 to 5 nozzles on a holder. With our 3 or 5-way holders nozzles can be changed over quickly and easily to adapt to different spraying requirements, maintaining maximum flexibility. ProStop™ pneumatic or ProStop-E™ electric nozzle valves can be specified as alternatives to a DCV.

3-WAY PROFLO NOZZLE BODY (HINGED CLAMP)

Accommodates 3 nozzles on a holder. Offered with clamps to fit 1/2, 3/4, 1 inch, 20 or 25mm boom pipe diameters and a 10 mm spigot. Fitted with a diaphragm check valve, to replace with ProStop, add 'PS' to part numbers shown.



Diaphragm Options	Part Number – Diameter of Pipe				
	1/2"	3/4"	1"	20mm	25mm
EPDM (RED)	4223N-B322	4223N-B323	4223N-B324	4223N-B327	4223N-B328
VTON® (GREEN)	4223N-B322V	4223N-B323V	4223N-B324V	4223N-B327V	4223N-B3228V

3-WAY PROFLO NOZZLE BODY (UDDER STYLE, EPDM DIAPHRAGM)

Accommodates 3 nozzles on a compact holder. Offered with clamps to fit 1/2, 3/4 or 1 inch boom pipe diameters and a 10 mm spigot. Fitted with a diaphragm check valve, to replace with ProStop, add 'PS' to part numbers shown.



Clamp Type	Part Number – Diameter of Pipe		
	1/2"	3/4"	1"
HINGED	4222N-B322C	4222N-B323C	4222N-B324C
SPLIT	4222N-B322	4222N-B323	4222N-B324

5-WAY PROFLO NOZZLE BODY (HINGED CLAMP)

Accommodates 3 nozzles on a holder. Offered with clamps to fit 1/2, 3/4, 1 inch, 20 or 25mm boom pipe diameters and a 10 mm spigot. Fitted with a diaphragm check valve, to replace with ProStop, add 'PS' to part numbers shown.



Diaphragm Options	Part Number – Diameter of Pipe				
	1/2"	3/4"	1"	20mm	25mm
EPDM (RED)	4223N-B522	4223N-B523	4223N-B524	4223N-B527	4223N-B528
VTON® (GREEN)	4223N-B522V	4223N-B523V	4223N-B524V	4223N-B527V	4223N-B5228V

SINGLE PROFLO NOZZLE BODY (HINGED CLAMP)

Offered with clamps to fit 1/2, 3/4, 1 inch, 20 or 25mm boom pipe diameters and a 10 mm spigot. Fitted with a diaphragm check valve, to replace with ProStop, add 'PS' to part numbers shown.



Diaphragm Options	Part Number – Diameter of Pipe				
	1/2"	3/4"	1"	20mm	25mm
EPDM (RED)	4221N-B122	4221N-B123	4221N-B124	4221N-B127	4221N-B128
VITON® (GREEN)	4221N-B122V	4221N-B123V	4221N-B124V	4221N-B127V	4221N-B128V

NOZZLE CONTROL VALVES

Either ProStop™ pneumatic or ProStop-E™ electrical valves to rapidly open and close flow to the nozzle. All ProFlo nozzle holders can be ordered pre-fitted with a ProStop™ or ProStop-E™ control valve in place of the DCV.



Actuation	Description	Part Number
PNEUMATIC	PROSTOP™	PS3/4F-PN
ELECTRIC	PROSTOP-E™	3305-0011



63.5 cm cord sets with M12 connectors are available to connect Prostop-E™. A CAN bus/ISO bus node is required for CAN bus communication, one node addresses up to 16 Prostop-E™.

Replacement piston assembly for pneumatic ProStop™ pt no: 43Q2741.

DUO REACT™ - TWIN VALVE NOZZLE BODY

A pneumatic or electro-pneumatically actuated nozzle body that allows the user to select one of 2 nozzles from the cab. Combines a single and a 4-way holder with twin valves so that they can be operated either singly or together. One electro-pneumatic Duo React™ nozzle body can be used as a section valve to control up to 7 pneumatic slave bodies.



Actuation	Part Number – Diameter of Pipe				
	1/2"	3/4"	1"	20mm	25mm
PNEUMATIC	4214-1502V	4214-1503V	4214-1504V	4214-1507V	4214-1508V
ELECTRO-PNEU	4214-2502V	4214-2503V	4214-2504V	4214-2507V	4214-2508V

Replacement piston assembly for Duo React™, part no: 4200-0045V.

Nozzle Filters

Precision-made in durable polypropylene or stainless steel mesh. Made in ISO 19732-2007 standard colours. For filter size recommendations see individual nozzle tables and page 47.

POLYPROPYLENE UNIVERSAL FILTERS

Part Number	Colour	Type	Mesh
TS01-50	Blue	Medium	50
TS01-100	Green	Fine	100



POLYPROPYLENE FILTERS (FOR GAT NOZZLES)

Part Number	Colour	Type	Mesh
TS02-50	Blue	Medium	50
TS02-100	Green	Fine	100



STAINLESS STEEL MESH CUP FILTERS

Part Number	Colour	Type	Mesh
3250A245	Blue	Medium	50
3210A245	Green	Fine	100



POLYPROPYLENE CUP FILTERS

Part Number	Colour	Type	Mesh
3210063P	Red	Coarse	30
3210065P	Blue	Medium	50



STAINLESS STEEL MESH FILTERS

Part Number	Colour	Type	Mesh
32100050	Blue	Medium	50
32100010	Green	Fine	100



Also available with ball check valve.

PROCLEAN™ ROTATING NOZZLES

360 degree cleaning. Reaches all container internal surfaces including neck for fast cleaning with minimum water usage. 20-40 l/min. ½ inch female BSP thread. PART NO: PC1/2F-36075



PROCLEAN™ TANK WASH NOZZLE

Rotating tank wash nozzle designed to be mounted downwards. Directs spray to top and sides of tank. 26-60 l/min. ½ inch female BSP thread. PART NO: PC1/2F-235120



PROCLEAN™ PLUS NOZZLE

A powerful single jet designed to clean the sediment at the base of containers. Use alongside the ProClean™ rotating nozzle. ½ inch female BSP thread. PART NO: 30B4SNF70E35



STATIC TANK WASH NOZZLE:

Multi jet fixed spray pattern. PART NO: 01TWQ2424



PROCLEAN™ VALVE

Either ProClean container wash nozzle screws on top. Press the container rim onto the metal bar to release the cleaning jet. ½ inch male BSP thread. PART NO: PV1/2F1/2M-MA



JET AGITATORS

Ensure good mixing and suspension of chemicals in the sprayer tank. Induction ratios of up to 5 to 1. PART NO: A1A5HE3371



CLEANLOAD™

Self contained induction unit featuring 26.5 litre hopper, Hypro venturi and Proclean™ rotating nozzle. 3 education rate options.



HYPRO VENTURI EDUCTOR

3 high flow options up to 90, 160 or 300 l/min. 2 inch universal flange ports and ½ inch push-fit for hopper rinse. PART NO: 3371-0038R



Valves & Flow Meters

BALL VALVES - MANUAL AND ELECTRIC

Robust and reliable 2, 3, 4 and 5 way ball valves that ensure spray liquid flows smoothly for minimal pressure loss. Glass reinforced polypropylene with bottom or side connection and a choice of threaded and flanged fittings.



CUSTOMISED CONTROL UNITS

Modular control units incorporating volumetric regulating valves, adjustable pressure relief valves, flowmeters and line filters with choice of inlet and bypass diameters. Control panels are also available to suit a wide variety of boom section combinations.

DIGIWOLF PADDLE FLOWMETERS

Low friction and high accuracy with programmable graphic display allowing threshold min/max alarm. Connect with fork couplings in 1¼", 1½" and 2". Powered by 12v DC or 2x AA batteries with auto switch-off.

Coupling	Power Option	Part Number
2" forked	12v dc	4627707A
2" forked	2 x AA battery	464628707



ORION ELECTROMAGNETIC FLOWMETERS

Measure the volume flow of electrically conductive liquids using a magnetic field. Accurate, robust and reliable, results can be displayed on the unit itself or output to a screen. Accurate to 0.5%, performance is not affected by fluid density or viscosity. Flange or ¾" to 2" threaded fittings.

Thread	With Display	Without Display
1½" nylon	464622BA51616	64622AA51616
2" nylon	464622BA61717	464622AA61717

FOOT FILTERS

First or preliminary stage of filtration. The coarse mesh prevents very large particles or debris from being drawn into the tank. 1", 1½", 1½" and 2" threads. 16 mesh filter element.



Thread	Part Number
1½"	0800A613
2"	0800A615

SUCTION FILTERS

Second stage filtration, removing larger particles. Offer protection for the pump and spray components. Available with 1½", 1½", 2" & 3" male ports. 30 and 50 mesh filter elements.



PRESSURE LINE FILTERS

Provide third stage filtration. Positioned between pump and spray lines they remove fine particles, preventing nozzle blockage and excessive wear. Available with ½", ¾", 1", 1¼" and 1½" female ports. 30, 50, 80 and 250 mesh filter elements.

ROW MARKERS

A bolt-on system includes blobber unit, compressor and all necessary pipework to suit a 24m sprayer.

PART NO: 52520005



Pipes Hose & Fittings

A comprehensive range of pipes and fittings supplied either individually or as sub-assemblies to an agreed specification. Specific o-rings are available for many threaded fittings, eliminating the need to use PTFE tape.

POLYPROPYLENE, NYLON AND PVC FITTINGS

Wide variety of fittings from 1/2" to 2 1/2". When specifying the material for your fittings consider operating pressure, chemical, stress and impact resistance.



QUICK RELEASE COUPLINGS

Wide variety of cam lever couplings from 1/2" to 3", manufactured in glass reinforced polypropylene for strength and resistance. Stainless steel also available.



NON-THREADED FITTINGS

Eliminate threads and welds to enable simpler fitting, freedom from leaks and perfectly aligned assembly. Manufactured in polypropylene. Universal flange, hose barb, and camlock boom-end connections, as well as venting nozzle body end caps.



PUSH TO CONNECT NOZZLE BODIES AND CAPS

Allows flexible positioning and easy adjustment of nozzle body position when spraying from non-standard booms.



PVC PIPE AND SPRAYBARS

Heavy duty, pressure rated up to 20 bar, 1/2" to 2" nominal bore, can be supplied pre-drilled or ready assembled with nozzle bodies and nozzles for convenient on-site fabrication.

HOSE

Options of 3/4" to 3" reinforced rubber hose for pressure applications and 1" to 3" Heliflex hose ideal for suction applications.

PRO-FIT™ FLANGE FITTINGS

Provide secure and repeatable fitting without threads or welding. Manufactured from glass reinforced polypropylene for strength and durability. Available in 1", 2" and 3" in a wide range of configurations, some of which are shown below. Connect with Hypro Universal Flange Clamps for even clamping pressure and durability. Pro-Fit™ Flange fittings are ideal for connecting Hypro pumps and Cleanload™ with universal flange ports.

	Part Number	Fitting Type
	UF200	2" Flange x 2" Flange
	UF300	3" Flange x 3" Flange
	UF100L	1" Elbow Flange x 1" Flange
	UF200L	2" Elbow Flange x 2" Flange
	UF300L	3" Elbow Flange x 3" Flange
	UF100L - HB150	1" Elbow Flange x 1½" Hose barb
	UF200L - HB200	2" Elbow Flange x 2" Hose barb
	UF300L - HB300	3" Elbow Flange x 3" Hose barb
	UF100 - HB150	1" Flange x 1½" Hose barb
	UF200 - HB200	2" Flange x 2" Hose barb
	UF300 - HB300	3" Flange x 3" Hose barb
	UF100 - MN100	1" Flange x 1" NPT male coupler
	UF200 - MN200	2" Flange x 2" NPT male coupler
	UF300 - MN300	3" Flange x 3" NPT male coupler
	UF200T	2" Tee flange
	UF300T	3" Tee flange
	BG-UFC0100E-A-S	1" Universal flange clamp and gasket
	BG-UFC0150E-A-S	1.5" Universal flange clamp and gasket
	BG-UFC0200E-A-S	3" Universal flange clamp and gasket
	BG-UFC0300E-A-S	3" Universal flange clamp and gasket

Testing & Monitoring Equipment

150MM MASTER PRESSURE GAUGE

0-10 bar with 0.1 bar graduations. Accurate to $\pm 1\%$ for comparative testing of boom pressure gauges in conjunction with multi-port adaptor.

PART NO: 366010100



MULTI-PORT PRESSURE GAUGE TESTING ADAPTOR

Designed to test the accuracy of a pressure gauge. Multi-ported to accommodate different gauge types.

PART NO: 360Q3166



SPRAYER TESTING KITS

A robust case containing a master pressure gauge and a multi-port adapter. Also contains a nozzle pressure testing kit (PART NO: 363Q3168), which can be used to check the pressure at the nozzle and a 1L measuring cylinder.

PART NOS:

01TESTCASE-EF3 (For EF3 nozzle bodies)

01TESTCASE-HARD (for Hardi nozzle bodies)



REDBALL INSTANT CALIBRATOR

Gives an instant, accurate flow rate reading in litres per minute. Hand held, no tools required.

PART NO: 01-1C310

CENTRIFUGAL PUMPS

- High speed rotation creates centrifugal force.
 - Low maintenance requirement and simple operation.
 - High flow rates up to 1400 l/min.
 - Up to 10 bar pressure.
 - Self-priming options available.
 - Simple plumbing and operation.
- **NEW** Forcefield seal offers superior dry run protection.
 - Suitable for high volume chemical application and liquid transfer.
 - Ideal for high speed, high volume spraying and transfer from bowsers.



ROLLER PUMPS

- Self-priming positive displacement pumps.
 - Roller rotation creates uniform output.
 - Flow rates from 7 to 235 l/min.
 - Up to 20 bar pressure.
 - Operate efficiently at PTO speed.
- Easily maintained with few moving parts.
 - Ideal for lower output small and medium sprayers.
 - Can be used as additional pump for high pressure rinsing or chemical dilution.



PISTON PUMPS

- Self-priming positive displacement pumps.
 - Pistons draw in and expel fluid from chamber.
 - Relatively low flow (up to 40 l/min) and higher pressure (up to 69 bar).
- Can be connected directly to PTO.
 - Ideal for stationary sprayers, misting and cooling systems.



SHURFLO DIAPHRAGM PUMPS

- Use a flexible diaphragm to capture and discharge a fixed volume of fluid.
 - Self-priming.
 - Smooth and consistent flow up to 23 l/min.
 - Pressure up to 10 bar.
- 12v, 24v or 230v mains electrical motors suitable for continuous or intermittent operation.
 - Ideal for smaller sprayers, mini bulk transfer and fluid circulation application.



Hypro Centrifugal Pumps

An impeller rotates at high speed to create a centrifugal force that feeds liquid through the system. Hypro's centrifugal pumps can deliver flow rates up to 1400 l/min making them ideal for wide booms and faster speeds. For rapid transfer from bowsers, see our transfer pump options on page 43.



Centrifugal Pumps are simple in design with no valves, they are durable, easy to maintain and suitable for pumping abrasive and corrosive materials. Plumbing is straightforward with no need for a relief valve, bypass or suction filter. Choose from hydraulic motor or PTO driven options.

Mechanical seal options include standard Viton®/ceramic, longer life Life Guard® silicon carbide (SiC) or the Forcefield™ wet seal for the best protection against dry-run and chemical bonding failures. Self-priming options are available or use Hypro's separate Self-Priming Adaptor (part no: 1530-0024S).

9307C - HYDRAULIC DRIVE

A robust pump ideal for heavy duty use. Features cast iron case, 316 stainless steel impeller, toughened shaft and bearings and hydraulically driven internal gear motor with case-drain. Optional Forcefield™ wet seal.



Model	Max. flow (l/min)	Max. pressure (bar)	Hyd. motor (l/min)	Seat	Inlet / Outlet
9307C-GM12	1400	9.7	87	Life Guard (SiC)	3"/2" NPT
9307C-GM12-U	1400	9.7	87	Life Guard (SiC)	3"/2" Flange
9307CWS-GM12	1400	9.7	87	Forcefield™	3"/2" Flange

For full details of Hypro Centrifugal Pump ranges and options, see current Hypro catalogue.

9306, NEW 9313, 9314, 9316 - HYDRAULIC DRIVE

A series of high performance, relatively small (301x237x230 mm) and lightweight (12 kg) pumps. Flow up to 1177 l/min and pressures of 10.3 bar. Available in cast iron or stainless steel models. Now offered with the **NEW** option of Forcefield™ seal for the best protection against dry-run and chemical bonding failures.



Model (standard seal*)	Model (Forcefield seal)	Max. flow (l/min)	Max. press. (bar)	Hyd. motor (l/min)	Inlet / Outlet
9306C-HM1C	9314C-M08	859	9.1	53	2" / 1½" NPT or 2" / 2" flange*
9306C-HM5C	9314C-M10	882	10.3	64	
9306C-HM3C	9314C-M16	878	9.5	91	
9306S-HM1C	9314S-M08	859	9.1	53	
9306S-HM5C	9314S-M10	882	10.3	64	
9306S-HM3C	9314S-M16	878	9.5	91	
9306C-HM1C-3U	9316C3U-M08	1083	8.8	53	3" / 2" flange
9306C-HM5C-3U	9316C3U-M10	1177	10.3	68	
9306C-HM3C-3U	9316C3U-M16	1162	8.8	91	
9306S-HM1C-3U	9316S3U-M08	1083	8.8	53	
9306S-HM5C-3U	9316S3U-M10	1177	10.3	68	
9306S-HM3C-3U	9316S3U-M16	1162	8.8	91	

* Cast iron (C models) have nylon impeller & Viton/Ceramic seals, 316 stainless steel (S models) have polypropylene impeller and Life Guard (SiC) seals.

* For 2"/2" universal flange add '-U' to part number. See page 37 for flange fittings and clamps.

Case drain motor available - Add suffix Y, e.g. 9314C-M08Y. Viton®/Ceramic seal and o-ring repair kit part number: 3430-0332. Life Guard (SiC) seal repair kit part number: 3430-0589. Replacement fluid (680 mls) for ForceField seal chamber part number: 2160-0096.

9305C - HYDRAULIC DRIVE

Flow up to 689 l/min and pressures up to 10.7 bar. Available in cast iron with Viton®/ceramic or Life Guard (SiC) seals and a nylon impeller. Self-priming option available.



Model	Max. flow (l/min)	Max. pressure (bar)	Hyd. motor (l/min)	Inlet / Outlet
9305C-HM3C	689	10.7	72	2" NPT or BSP
9305C-HM3C-SP*	674	10.6	72	2" NPT or BSP

For the Life Guard (SiC) seal add suffix "-B".

* 'SP' denotes self-priming option with NPT thread. For BSP thread replace with 'BSP'.

9047C - PTO DRIVE

Parallel oil bath gear drive for connection directly to a 540 rpm PTO. Capable of up to 800 l/min and pressure up to 12.4 bar. Cast iron with a glass filled nylon impeller. 2" inlet and 1½" BSP or NPT outlets. Fitted with Life Guard (SiC) seal as standard. Self-priming option available.



Model	Max. flow (l/min)	Max. pressure (bar)	Hyd. motor (l/min)	Inlet / Outlet
9047C	806	12.4	540	2" / 1½" NPT
9047C-SP*	738	11.7	540	2" / 1½" NPT

* 'SP' denotes self-priming option with NPT thread. For BSP thread replace with 'BSP'.

9303 - HYDRAULIC DRIVE

Available in cast iron and 316 stainless steel for superior chemical corrosion resistance. Flow up to 556 LPM and pressure up to 10 bar. Cast iron models have nylon impeller and Viton®/Ceramic seal as standard. Stainless steel models have polypropylene impeller and Life Guard (SiC) carbide seals.



Model	Max. flow (l/min)	Max. pressure (bar)	Hyd. motor (l/min)	Inlet / Outlet
9303X-HM1C	432	9.0	49	1½" / 1¼" NPT or 2"/1½" flange*
9303X-HM2C	367	6.5	23	
9303X-HM3C	473	6.8	90	
9303X-HM4C	435	6.4	26	
9303X-HM5C	556	10	60	

For cast iron replace X with 'C', for 316 stainless steel replace X with 'S'.

For self-priming version add "-SP".

For Life Guard (SiC) seal add suffix "-B".

* For 2" inlet / 1½" outlet universal flange add suffix "-U".

Viton/Ceramic seal and o-ring repair kit part number 3430-0332.

Life Guard (SiC) seal repair kit part number: 3430-0589.

For full details of Hypro Centrifugal ranges and options, see current Hypro catalogue.

Hypro Transfer Pumps are ideal for tank filling, high capacity liquid transfer irrigation and flood water removal. Offering flow rates up to 1832 l/min and up to 4.1 bar. Lightweight polypropylene casing suitable for use with agrochemicals. Self-priming when pre-filled with water. Maximum suction height of 5 metres. Impellers are made from either nylon or polypropylene with stainless steel inserts, allowing you to work with fluids containing solid particles up to 0.95 cm in diameter. Hydraulic, petrol or electric drive options.

HYDRAULIC MOTOR DRIVE



Model	Max. flow (l/min)	Max. pressure (bar)	Hyd. motor (l/min)	Inlet / Outlet
9342P-HM1C-5SP	757	4.0	38	2"
9342P-HM5C-5SP	780	4.1	42	2"
9343P-GM6Y-SP	1703	3.6	40	3"
9343P-GM10Y-SP	1832	4.0	60	3"

Y denotes case drain version.

Replacement EPDM Seal Kit part number: 3430-0635.

PETROL AND ELECTRIC DRIVES



Model	Max. flow (l/min)	Max. pressure (bar)	Motor type	Inlet / Outlet
1442P-65SP	757	4.0	6.5 HP	2" / 2" NPT
9742P-050SPT	454	2.2	Single phase 50 Hz	
9742P-050SPT3	454	2.2	3 phase 50 Hz	
9742P-075SPT3	606	2.6	3 phase 50 Hz	

For full details of Hypro Transfer Pump ranges and options, see current Hypro catalogue.

Hypro Roller Pumps

4 or 8 revolving rollers create smooth flows up to 235 l/min and up to 20 bar, suitable for smaller sprayers or as an additional pump for higher pressure rinsing or chemical dilution. Roller pumps are self-priming and easily located on the sprayer and, with few moving parts, they are easily maintained. Hydraulic, PTO, petrol or electric drives are available. Casing, roller and seal materials can be specified according to the chemical compatibility required.

1502 SERIES



Model	Max. LPM	Max. BAR	Max. RPM	Connection	Solid Shaft
1502C	235	13.8	1000	1½" NPT*	15/16"
1502N	235	13.8	1000	1½" NPT	15/16"
1502XL	235	13.8	1000	1½" NPT	15/16"

1700 SERIES



Model	Max. LPM	Max. BAR	Max. RPM	Connection	Solid Shaft
1700C	170	13.8	1000	1" NPT	15/16"
1700N	170	13.8	1000	1" NPT	15/16"
1700XL	170	13.8	1000	1" NPT	15/16"

7560 SERIES



Model	Max. LPM	Max. BAR	Max. RPM	Connection	Solid Shaft
7560C	85	20	1200	¾" NPT	15/16"
7560N	85	20	1200	¾" NPT	15/16"
7560XL	85	20	1200	¾" NPT	15/16"

7700 SERIES



Model	Max. LPM	Max. BAR	Max. RPM	Connection	Solid Shaft
7700C	83.7	13.8	800	¾" NPT	15/16"
7700N	83.7	13.8	800	¾" NPT	15/16"
7700XL	83.7	13.8	800	¾" NPT	15/16"

6500 SERIES



Model	Max. LPM	Max. BAR	Max. RPM	Connection	Solid Shaft
6500C	82.5	20.7	1200	¾" NPT	5/8"
6500N	82.5	20.7	1200	¾" NPT	5/8"

C denotes cast iron, N denotes Ni-Resist and XL denotes Silvercast.

Standard 'super' rollers are suitable for most agrochemical spray liquids. For liquid fertiliser choose Ni resist or Silvercast with polypropylene rollers (add suffix '-T3') and Buna-N seals (add suffix 'M'). For mild acid spray liquids choose XL (Silvercast) with poly rollers and Viton® seals (add suffix 'Q'). For Teflon rollers add suffix '-T2'. For reverse rotation: add suffix "-R".

*Also available in 1½ BSP thread.

For full details of Roller Pump ranges and options, see current Hypro catalogue.

Shurflo 12/24v Diaphragm Pumps

Shurflo diaphragm pumps use a flexible diaphragm to capture and discharge a fixed volume on each stroke with smooth, consistent flow up to 23.5 l/min. Standard features include heavy duty 12v or 24v motors suitable for continuous as well as intermittent operation. Shurflo pumps are self-priming. Bypass options are suited for agrochemical spraying where pressure varies, this feature avoids the pump cycling on and off too frequently. Automatic demand models for set flow and pressure situations such as spot spraying are also available. Ideal for smaller sprayers, mini bulk transfer and fluid circulation applications. Some examples from the extensive Shurflo range are shown below.

8000 SERIES



Model	Pressure (Bar)	Flow (l/min)	Amps	Port Size	Power
8000-543-210 (Bypass)	0.7	4.8	3.8	3/8" NPTF	12 Volt
	1.4	4.5	4.4		
	2.1	4.0	5.0		
	2.8	0.19	5.5		

2087 SERIES



Model	Pressure (Bar)	Flow (l/min)	Amps	Port Size	Power
2087-593-135 (Automatic Demand)	0.7	10.6	5.3	1/2" MSPT	12 Volt
	1.4	10.2	5.5		
	2.1	8.9	6.7		
	2.8	7.8	7.7		
	3.4	5.4	8.0		

2088 SERIES



Model	Pressure (Bar)	Flow (l/min)	Amps	Port Size	Power
2088-474-144 (Automatic Demand)	0.7	10.6	2.41	1/2" MSPT	24 Volt
	1.4	8.5	2.63		
	2.1	6.6	2.73		
	2.8	4.7	2.71		

4111 SERIES



Model	Pressure (Bar)	Flow (l/min)	Amps	Port Size	Power
4111-035 (Demand)	0.7	21.6	12.2	1/2" MPT	12 Volt
	1.4	19.0	14.5		
	2.1	16.2	16.1		
	2.8	13.2	17.2		

8000 SERIES



Model	Pressure (Bar)	Flow (l/min)	Amps	Port Size	Power
5059-3610-D011 (Bypass)	0.7	17.8	9.0	1/2" NPTF	12 Volt
	2.1	15.5	12.0		
	4.1	6.8	16.9		
	5.5	1.5	20.1		

Valves and diaphragms of different material can be specified according to the chemical compatibility required. For full details of Shurflo pumps see www.shurflo.com.

Knapsack and Hand Held Sprayers

VERMOREL COMFORT PRO SPRAYERS

Adjustable padded straps and an ergonomic frame make the Vermorel sprayer ideal for the professional operator.

Choose the manual version, requiring just 10 strokes/min with left or right handed option or the Li-ion battery powered model that includes a 2.5 hour quick charger.



COSMOS 18 SPRAYER

High performance pump, 60 cm lance, easily changeable nozzle and liquid level indicator. A lower cost option.



ELYTE SPRAYERS

Compression sprayers, ideal for spraying smaller areas.

Viton® seals allow use of more demanding spray materials, such as disinfectants.



Other sprayer models and spraying accessories are available including; lances and extensions up to 3.6 m reach, spray booms, spray shields and pressure regulating valves.

For full details see www.knapsacksprayers.co.uk.

Part Number	Models description	Capacity
18102022	Vermorel 2000*	16 litre
18102088	Vermorel 1800	16 litre
18102140	Vermorel 3000* Electric	18 litre
18102216	Cosmos 18	18 litre
18101005	Elyte 14	8 litre
18101003	Elyte 6	6 litre

* Includes pressure relief valve, telescopic lance & nozzle pack

NOZZLES FOR KNAPSACK AND HAND HELD SPRAYERS



POLIJET (AN) AND DEFLECTIP (DT) ANVIL 55-130°

A choice of spray angles suitable for different spray widths. Blockage resistant design (see page 26).



FULL CONE (FCX) 80°

Full pattern for spot treatment of weeds.



HOLLOW CONE (HCX) OR DISC & CORE

Fine droplets for spraying insecticides and fungicides (see page 25).



EVENSPRAY 80°

Distributes a medium fine spray evenly across the swath. Ideal for all targets (see page 24).



A kit containing Hollow Cone, Full Cone, Polijet and a 100 mesh green cup filter is also available, part number: 30HK NAP. For filter information see page 32.

Problem	Cause	Corrective Action
Frequent nozzle blockage.	Filter screen too coarse.	Fit finer filter screen.
Pump will not suck.	Suction filter blocked.	Clean filter screen.
Pressure gauge fluctuates, nozzles splutter.	Air in line/pump sucking air.	Check suction lines for air leaks.
Output falls across one boom section.	Pressure line filter blocked.	Clean filter screen.
Main gauge pressure falling.	Suction and/or flushing filters blocked.	Clean and/or flush filters.

NB. It is possible to “screen off” certain chemicals if filtration is too fine.
Always check chemical label for specific advice on filtration.

RECOMMENDED FILTERS FOR DIFFERENT FLOW RATES

Approximate Flow Rate Per Spray Nozzle	Typical Spray Nozzle Example		Nozzle Filter	Small Pressure Line Filter Element	Large Pressure Line Filter Or Flushing Filter Element	Suction Filter Element
1.2 L/min or less	01	015	100#/Green	80#/Yellow	80#/Yellow	50#/Blue
	02	03				
1.2 to 3.2 L/min	04	05	50#/Blue	50#/Blue	50#/Blue	30#/Red
	06	08				
3.2 L/min or more	10		30#/Red	30#/Red	30#/Red	30#/Red
	15	20				

Filter colour coding is based on ISO 19732:2007.
For Hypro filters, see pages 32 and 35.

Troubleshooting: General Spraying

Symptom	Problem
	<p>Chemical remaining in tank after spraying.</p> <p>Insufficient chemical applied resulting in poor agrochemical performance.</p>
	<p>Insufficient chemical in tank to complete spraying.</p> <p>Too much chemical applied therefore likelihood of damage to the crop.</p>
	<p>Poor distribution across boom.</p> <p>Strips that are untreated after spraying or strips showing damage to crop.</p>
	<p>Visible cloud behind sprayer during operation or damage to neighbouring crops.</p>
	<p>Excessive weed, pest, disease infestation and poor crop growth.</p>

Cause (s)	Corrective Action
Pressure gauge or regulator inaccurate.	Test, recalibrate and replace if necessary.
Restrictions in pipes and/or hoses.	Check pressure at nozzle and note difference with main gauge. Fit larger or better routed pipe and/or hoses.
Blocked nozzles or filters.	Clean and calibrate nozzles (see page 7). Clean all filters.
Worn or damaged nozzles.	Check and replace nozzles.
Pressure gauge or regulator inaccurate.	Test, recalibrate and replace if necessary.
Worn or damaged nozzles.	Check and replace nozzles.
DCV or nozzle valve damaged or worn preventing nozzle shut-off.	Replace or service DCV or nozzle valve.
Blocked nozzles or filters.	Clean and calibrate nozzles (see page 7). Clean nozzle filters.
Worn or damaged nozzles.	Check and replace nozzles.
Boom height incorrect or excessive boom bounce.	Check boom height relative to spray angle of nozzles, (see page 5). Reduce speed and review nozzle choice.
Spraying pressure too high.	Reduce spraying pressure to recommended level.
Pressure gauge inaccurate.	Replace gauge.
Too windy for spraying.	Discontinue until wind drops to acceptable level (see page 4).
Wrong choice of nozzles or pressure.	Consider using drift reducing nozzles or reducing pressure.
Wrong choice of nozzles or pressure.	Consult chemical label and Hypro for best nozzle choice.
Worn or damaged nozzle.	Check and replace nozzles as appropriate.
Incorrect boom height.	Check and adjust (see page 5).
Poorly maintained sprayer.	Have sprayer checked by an AEA approved sprayer test station.
Not related to application.	Ask your agronomist or chemical distributor for advice.

Troubleshooting: Centrifugal Pumps (Hydraulic Motor)

In case of problems, first consider if the most appropriate pump has been selected and is correctly plumbed into the hydraulic system. If performance is not satisfactory, check the following guide for possible problems and solutions.



Problem: Low Fluid Discharge	Corrective Action*
Pump not primed.	Remove topmost vent plug from face of pump and run pump to expel trapped air.
Air leaks in inlet line.	Check and reseal inlet fittings.
Blocked or clogged line filter.	Inspect filter and clear any debris from screen.
Undersize inlet line or collapsed hose.	Suction line should be the same diameter as inlet port of pump or larger.
Incorrectly sized hydraulic motor.	Select correct size motor for your hydraulic system.
Eye of impeller rubbing on volute.	Remove volute (front cover) and inspect the impeller. If wear detected, sand the impeller eye O.D. with emery cloth.

Problem: Hydraulic System Overheating	Corrective Action*
Incorrectly sized hydraulic motor.	Select correct size motor for your hydraulic system.
Insufficient hydraulic hose size.	Check hydraulic hose size. Hose should be at least 1/2" or 3/4" for large open centre systems.
Bypass Adjustment Screw set to bypass too much oil.	Close adjustment screw on side of hydraulic motor to lessen the amount of oil being bypassed.
Incorrect metering orifice installed in pressure port.	Refer to installation manual for correct sizing.

* Always refer to pump installation manual before working on a pump. Hypro pump manuals can be found at www.hypro.pentair.com.

Troubleshooting: Diaphragm Pumps

In case of problems, first consider if the most appropriate pump has been selected and is correctly plumbed into the hydraulic system. If performance is not satisfactory, check the following guide for possible problems and solutions.



Problem: Pump Does Not Suck	Corrective Action*
Suction filter blocked.	Clean filter.
Diaphragm or valves damaged or not seating.	Check valves and clean seats. Check and replace diaphragms. Blueflex long life diaphragm part number: 47550081.
Restriction in suction line.	Rectify restriction.
Air entering pump inlet.	Check for leaks in the hose and pipework on the suction side of the pump. Once resolved, with one or more boom sections open, run pump for 1 or 2 minutes at zero pressure, to evacuate all air.
Problem: Gauge Needle Fluctuates & Nozzles Spit Air	Corrective Action*
Pump not evacuated of air or sucking air.	Check for leaks in the hose and pipework on the suction side of the pump. Once resolved, with one or more boom sections open, run pump for 1 or 2 minutes at zero pressure, to evacuate all air.
Problem: Pump & Gauge Needle Pulsate	Corrective Action*
Incorrect pressure in air receiver.	Pressurise air receiver to between 25 and 33% of operating pressure.
Problem: Loss Of Pump Pressure	Corrective Action*
Pressure regulator faulty or lacking capacity.	Repair or replace pressure regulator.
Pump capacity insufficient for nozzles fitted.	Change nozzles and / or spraying speed.
Diaphragm / valves damaged.	Check and replace. Blueflex long life diaphragm part number: 47550081.
Flow restricted.	Check all filters and lines.

* Always refer to pump installation manual before working on a pump.

Conversions & Formulae

NOZZLE OUTPUT FOR OVERALL SPRAYING

$$\text{Litres/min per nozzle} = \frac{\text{L/Ha} \times \text{km/hr} \times \text{nozzle spacing (m)}}{600}$$

NOZZLE OUTPUT FOR BAND SPRAYING

$$\text{Litres/min per nozzle} = \frac{\text{L/Ha} \times \text{km/hr} \times \text{band width (m)}}{600}$$

CORRECTION FOR SPECIFIC GRAVITY OF SPRAYED LIQUID

Application rates shown in the nozzle charts in this pocket guide are based on tests with plain water. Calculating a Correction Factor allows you to use the tables to select a nozzle for liquids that have a different specific gravity (S.G.) to water (e.g. liquid fertiliser):

$$\text{Correction Factor} = \sqrt{\frac{1}{\text{S.G.}}}$$

Use the Correction Factor to calculate a Reference Application Rate:

$$\text{Reference Application Rate l/ha} = \frac{\text{Target Application Rate in L/Ha}}{\text{Correction factor}}$$

Use this Reference Application Rate to select a nozzle from the charts on pages 14-28. These settings will then apply the **Target Application Rate** of the higher S.G. fluid..

Example: When aiming to supply 240 l/ha of spray liquid with a specific gravity of 1:28 the correction factor calculates to 0.88:

$$\frac{240 \text{ l/Ha}}{0.88} = 273 \text{ (use this figure to select the nozzle, and it will apply 240 l/ha)}$$

USEFUL CONVERSIONS

	MULTIPLY BY	TO OBTAIN
Centimetres (cm)	x 0.3937	inches
Metres (m)	x 3.281	feet
Kilometres (km)	x 0.6214	miles
Hectares (Ha)	x 2.471	acres
Millilitres (ml)	x 0.035	fluid ounces
Litres (l)	x 0.22	Imperial gallons
Litres (l)	x 0.264	US Gallons
Bar	x 14.5	psi

To convert litres/hectare to gallons/acre divide by 11.3 (imperial)



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DUO REACT™ TWIN VALVE NOZZLE BODY

ULTRA LOW
DRIFT

GUARDIAN
AIR TWIN

3D NOZZLE

GUARDIAN
AIR

ESI
FERTILISER
NOZZLE

Precision spraying starts by choosing the right nozzle. Duo React is a simple, compact and inexpensive way to switch nozzles from the cab.



HYPRO® NOZZLES

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