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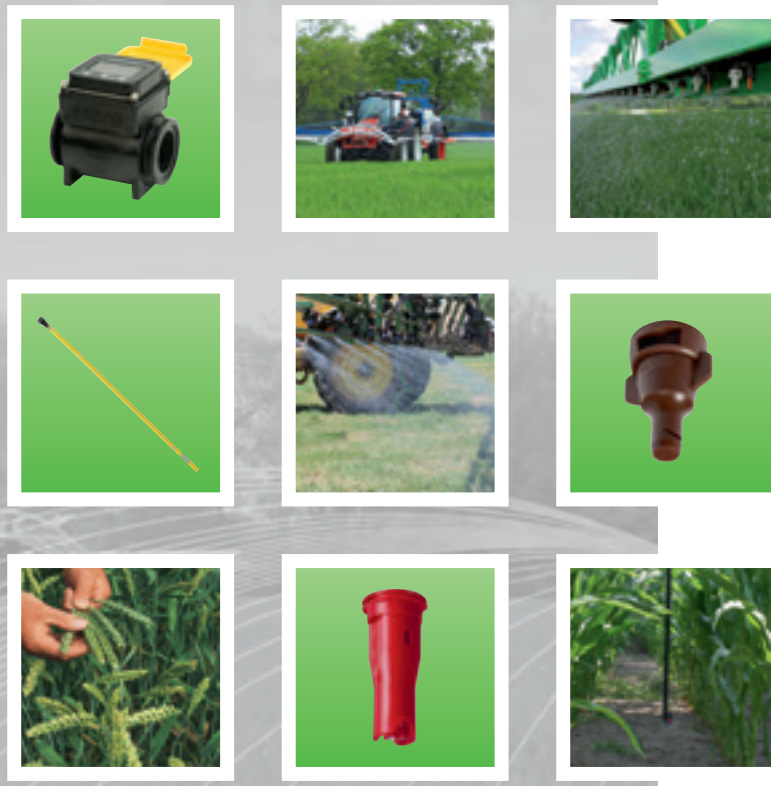
LECHLER

Application of Liquid Fertilizer Recommendations Nozzles and Accessories

Catalogue F 2017



Liquid Fertilizer

LECHLER AGRICULTURAL SPRAY NOZZLES – GOOD FOR YOUR CROP, GOOD FOR THE ENVIRONMENT

Lechler is a world leader in nozzle technology. For over 135 years, we have pioneered numerous groundbreaking developments in the field of nozzle technology. Comprehensive nozzle engineering know-how is combined with a deep understanding of application-specific requirements to create products that offer outstanding precision, reliability and durability.

Modern plant protection involves more than just the use of environmentally friendly chemicals. It is above all a question of precision. In order to achieve uniform coverage, the droplets must reach the target as exactly as possible. Losses due to drift, run-off or evaporation should be avoided – in favour of the environmental protection.

The application technology and here particularly the plant protection nozzles must therefore meet very high requirements. Today, nozzles must offer a degree of precision that would have been considered impossible just a few years ago.

As a globally leading manufacturer of precision nozzles, Lechler is ideally prepared to meet this challenge. For decades now, our products have set the technological standards in the fields of crop protection and liquid fertilizer application. Through regular and extensive investment in research and development, we ensure that this will also remain the case in the future. The functions and characteristics of our precision nozzles are defined exactly and objectively right from the start. This process is based on sophisticated measuring techniques and our proven documentation system.

State-of-the-art design and simulation techniques guarantee practically-oriented products with a high practical value.

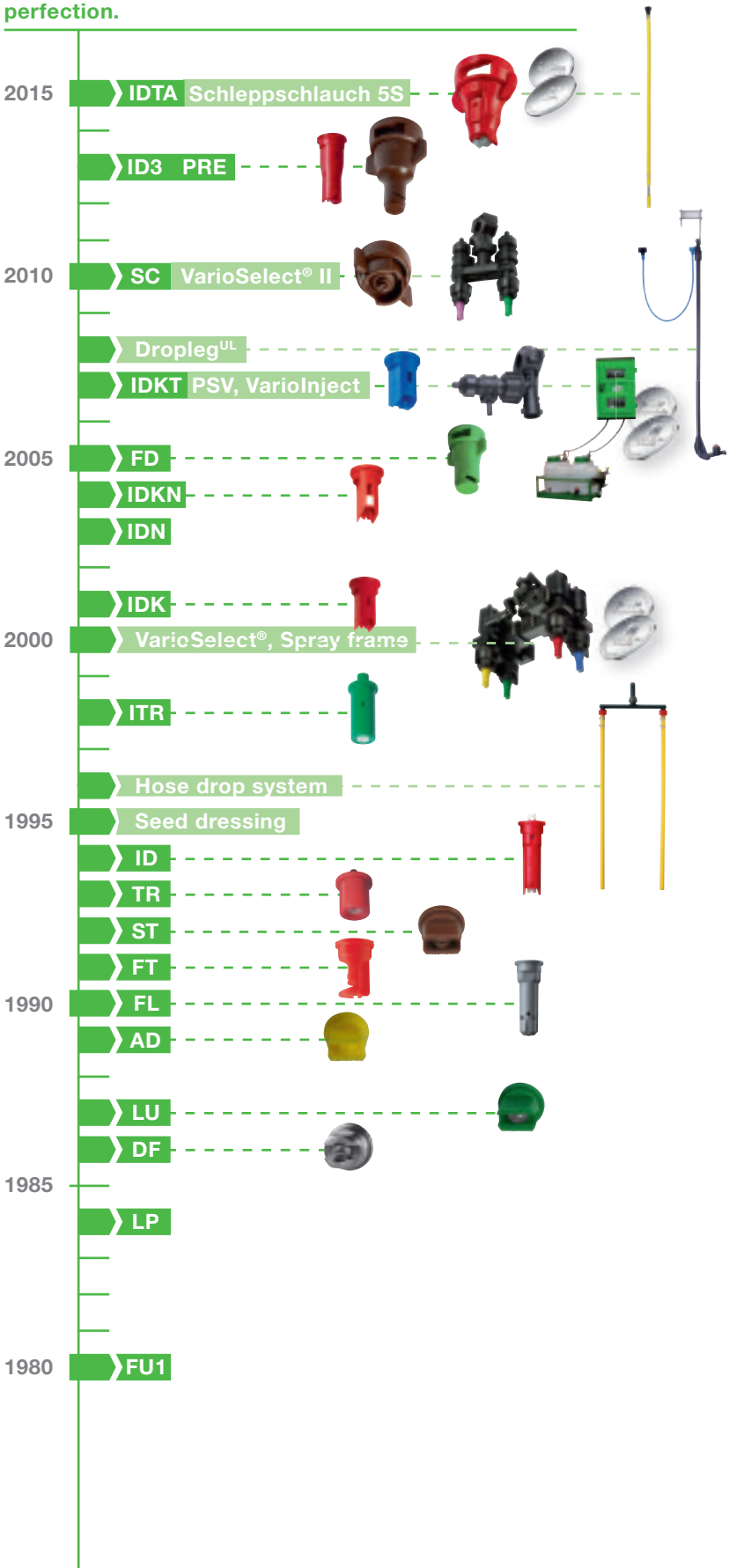
With Lechler nozzles, one spray jet is the same as the next. This demands a high level of precision and care in production. Our processes are therefore subject to permanent quality control measures, from the incoming goods department, through development and production right up to dispatch. Our quality management system is based primarily on the requirements of our customers and is certified in accordance with ISO 9001:2008. Lechler nozzles comply with the requirements of the Julius Kühn Institute, the German Plant Protection Act as well as European EN and international ISO standards.

Thanks to close cooperation and active exchange of information with official test institutes, the chemicals and liquid fertilizer industry, the equipment manufacturers and last but not least agricultural consultants, we also ensure that we are fully up-to-date on current practical requirements. After all, one thing is certain: solutions for practical applications can only be developed from practical knowledge.

This catalog contains our comprehensive Lechler agricultural spray nozzle and accessory range so see for yourself our product range.

PROGRESS MEANS FURTHER DEVELOPMENT

Therefore success is not a final state for us, but simply a further step on the way to even greater perfection.



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BENEFITS OF LIQUID FERTILIZER

Economical advantages not only in combination with pesticides

The nitrogen price of LF is very often lower compared to the granulated fertilizer. The application of LF in combination with pesticides reduces additionally the operational costs. On average the price of LF has been 15 % below the granulate version. In addition the operational application costs can be reduced by 2.5 – 3 Euro per hectare with combined application and savings in transport and handling (SKW/2011).

Accurate and even distribution of LF with increased output

Flat fan or special fertilizer nozzles from the Lechler quality range guarantee a precise and unique application to the field borders. This can be achieved also with wider working widths and is less affected by wind conditions compared to a granulate spreader.

Higher efficiency of fertilizer – less leaching losses

LF can be absorbed also by the leaves. Especially in dry periods the fertilizer can be more effective. An adapted splitting on the crop request and growth stadium can be realized easily. This eliminates nitrogen leaching into the ground – important for areas with water protection requirements.

LF application in combination with pesticides

The mixture of LF with pesticides, nutrients and growth regulators has a number of advantages:

- Reduction of passes in the field
- Increased output in the high season
- Protection of environment
- Cost reduction in crop care

Less drift

By adding LF the droplet evaporation can be reduced and limits atmospheric pollution.

Improved efficiency of the added pesticides

LF improves the coverage at the crop and enhances the adhesion of droplets. The absorption of the pesticides via leaves is much higher. In combination with herbicides the LF enables a reduction of the herbicides quantity without loss of efficiency, in numerous cases.

Essential requirements for combined applications of LF and pesticides

The following criteria should be fulfilled for a successful combined application:

- Compliance for the manufacturers guide lines (LF & pesticide)
- Coherence of the time schedule (fertilizer – plant protection)
- Compatibility of the individual components
- Minimum application rate of 150 l/hectare
- Use of injector nozzles at low pressure level and high drift classification
- Crop tolerance of spray tank mixture

Important for a successful combined application are the quality of LF and the compliance of the pesticides manual instructions. This is especially related to the potential volume of pesticide reductions and the application conditions.

CONSTITUTION AND CHARACTERISTICS OF LF VARIANCES

UAN (urea-ammonium nitrate)

UAN (liquid urea-ammonium nitrate) is the most popular type of LF. Pure UAN includes 28 % N by weight nitrogen.

50 % of the nitrogen is amide ($+NH_2$), app. 25 % is ammonium (NH_4+) and the other quarter is nitrate (NO_3-). LF with premium quality should possess a high surface tension, a neutral pH value and a level of Biuret below 0.2 – 0.3 %. Amide nitrogen is available for the crop 1 – 2 days after application. The ammonium and nitrate components can be absorbed by the leaves and roots directly after the application.

LF has a different density to water – this means at the same pressure level there are different flow rates. If LF is mixed with water the spray parameters of water are relevant. The mix ratio of water – LF should be 3 : 1 volume relation, better 4 : 1, otherwise the risk of scorching the crop increases.

The higher densities of LF are increasing loads on the sprayer tank and axles of the sprayer. Attention should be paid to the maximum technical loading data of the equipment.

External temperature and behavior of LF

LF has a minimum critical temperature. LF 28 for instance with a density of 1.28 g/cm^3 is stable down to a temperature of -17 °C. Below this temperature particles are crystallizing and separate. This causes a clogging of filters, nozzles and other sprayer components. LF with a density of 1.30 will crystallize at -9 °C, and with a density of 1.32 at 0 °C. For these variances the conditions of storage, transport and application should be above the depth of frost penetration. It should be watered down; an excellent agitation system is required for this thinning process.

Despite the density LF has a higher viscosity. In early spring time at low temperature conditions there is a larger difference between the pressure in the boom line and the pressure gauge. Sprayers without electronic measurement of the fluid (flow meter) should be calibrated by use of a measuring cup before starting the application. If necessary the pressure level should be adjusted and can be between 0.1 and 1.0 bar above spray table values.

CONSTITUTION AND CHARACTERISTICS OF LF VARIANCES

LF with high level sulfur components

Some LF has an additional sulfur component, which enables effective fertilizing in agricultural and nursery crops. The sulfur is available in 2 different chemical variantes. Firstly as ammonium sulphate, which is immediately available for the plant. The other variant is ammonium thio sulphate; this reacts more slowly with the soil. Step by step the crop absorbs the different components on request.

This sulfur LF can be sprayed like pure LF (gentile application of UAN on the crop), because it can be mixed with pesticides as well and has a high compatibility to the crop. The total content of nitrogen can achieve a level of 20 – 27 % and the water soluble sulfur is 3 – 8 %.

LF with lower level of sulfur components

Liquid ammonium sulphate includes minimum 8 % ammonium nitrogen and 9 % water soluble sulfur. If this LF is applied by a field sprayer onto the leaves the pH value should have a level of 5.5 – 6. Attention: Liquid ammonium sulphate can be very acidic! This LF is often sprayed to accelerate the straw rotting process by spraying 280 l/ha, the rate of nitrogen is then 30 kg N/ha. This type of LF cannot be mixed with fluid potassium fertilizer or alkaline partner components.

N-P solutions

This LF has 34 % phosphor by weight and 10 % ammonium nitrogen share. Both components can be absorbed also via the leaves. Often NP is mixed with nitrogen LF. The relation of mixing is flexible and should be done on the crop request N : P_2O_5.

For the NP as well as for the mixture with nitrogen LF the application tables for LF are relevant (see page 21).

Liquid Urea

LU is contrary to LF nitrogen or NP solution, an organic, almost neutral liquid. Therefore this is less corrosive. The best crop tolerance can be achieved at an urea concentration of 0.5 – 3 %, for grain up to 10 %. A problem is the limited solution capability. The dilution process of 10 kg N (= 22 kg urea) takes so much energy from the water that a water temperature of 15 °C will drop to zero. During this diluting process the temperature declines and the dilution is getting worse again. A professional agitation system is evidently required. Mostly this process is managed by stationary equipment, not by the sprayer. The application rate can be determined by the application tables of water using the correcting factors (see page 21).

Type of LF	Specific weight [kg per liter]	Nutritional value 110 Liter N-solution includes	
		kg N	kg P/S
LF-28 (N-solution)	1.28	36	-
NP-solution-10/34	1.38	14	48
LF-S-solution	1.28	31	5
LF-S 25/6	1.31	33	8
ASL-solution	1.24	10	11
Liquid urea	1.10	22	-

APPLICATION OF LF IN A FUTURE ORIENTATED AGRICULTURE

Guest comment of Mr. Fuchs, SKW, LF application research department

The demands of the worldwide markets force the farms to optimize the special intensity, means also lowering costs. One opportunity is the substitution of granulated fertilizer by liquid variances. The advantages are not only based on the cheaper nitrogen price.

LF includes further positive characteristics which contribute to a positive result.

One characteristic is the same but mostly higher efficiency of LF compared to granulate.
But in practice there is still uncertainity about the uptake via leaves and the risk of scorching. High scorching will lead to lower yield.
Therefore the right choice out of the variances of LF is required for a successful fertilizing.

Additionally the right nozzle and application technology contributes to a positive result.

Impact of LF

In Germany the percentage of LF in relation to the total nitrogen market stayed on average last 10 years at a level of 13 – 15 % constantly. In the same period the granulated KAS dropped down from 61 to 50 %. The most applied LF was a LF with a share of 28 – 30 % nitrogen. This kind of LF is tolerated best by the crops.

Very positive effects can be gained with the new PAISIN-S 25/6 and Alzon Liquid - S25/6 (25% N, 6% S).

The optimum concentration of sulfur is 3 – 5 %, due to crop tolerance. The sulfur in the combined N-/S-LF is available immediately for the crop, as sulfate or ammoniumthiosulfate.

APPLICATION OF LF IN A FUTURE ORIENTATED AGRICULTURE

Guest comment of Mr. Fuchs, SKW, LF application research department

Uptake via soil (roots) or leaves

Researches of industry and governmental institutes verify the efficiency of LF in compari-son to granulated fertilizers. (See table 1) Scientific resear-ches confirm that during a vegetation period the kind of fertilizer used influence on the yields is only marginal, but in the average a number of years there is no significant difference. But in a dry spring and early summer time periods LF has evident advantages compared to granulated ones.

The reason is related on a higher level of leaves uptake of LF.

The question if the N fertilizer application should be granulated or liquid is secondary. Important is the price-ratio performance and the technical resources of the farm. From the experience there are no big differences between the most common fertilizers KAS, nitrogen-LF and urea. This is valid if all basic rules and requirements have been fulfilled.

	Cereal	Rapeseed	Corn	Potatoes	Sugar beets	Total
Number of tests	155	15	25	28	21	244
without N	67	73	90	82	94	74
PIASAN® 28	100 (90.1 dt/ha) yield	100 (40.6 dt/ha) yield	100 (97.7 dt/ha) yield	100 (432 dt/ha) yield	100 (677 dt/ha) yield	100
KAS	100	99	99	99	99	100

Table 1: Comparison of yields fertilized without or different types of nitrogene, average of yields 1993 – 2010, 3 different test areas in Saxonia, Niedercunnersdorf, Trossin and Rosenow.

LF quality secures yield

LF is a pressure less fluid which can be applied by conventional plant protection sprayers. Besides the application technology the quality of the LF is important for a successful crop adaption. The risk of scorching is then very low under all conditions, also in very sensitive situations. This is also valid in combination with pesticide application.

Positive experiences enable the farmer to repeat this in the following years. Premium quality LF, like PAISIN® 28 from SKW guarantees beside a precise labeled nitrogen component:

- High surface tension
- pH value close to neutral
- Low level of Biuret content

These quality characteristics are not mentioned in the governmental fertilizer directives but are essential for the successful application of LF.

LF quality essential for crop tolerance

It is well known that upon critical application conditions and sensitive crop situations the quality of LF influences the crop tolerance preferably. Pictures 1 and 2 show the LF application in winter wheat at BBCH stadium 32 – 37, the first with high the other one with low surface tension. The farmer can easily see this. LF with high surface tension creates big drops on the leaf. With low surface tension there is a complete coverage.

The application technology should be chosen to adapt to different situation. The basic rule is: The more sensitive the crop surface is the use of coarse drops at reduced spraying pressure should be used.

Picture 1: LF application with high surface tension (70 mN/m)

Picture 2: LF application with low surface tension (30 mN/m)

APPLICATION OF LF IN A FUTURE ORIENTATED AGRICULTURE

Guest comment of Mr. Fuchs, SKW, LF application research department

Risk of lower yields can be eliminated

There have been a lot of field trials made with obvious wrong application features. The application with conventional flat fan nozzles on negative conditions (morning dew, permanent rain before) caused in late stadium in winter wheat leaf necrosis on average of 13 %. The consequences of this necrosis were lower yields of 10 %.

This compared to test variances of LF applied by hose drops or KAS granulates. There was no difference in the level of raw protein. Nevertheless these losses of yield are not acceptable. The relation of yield losses compared to the scorched crop surface is relatively small. Before every application it is important to identify the right application technology for minimizing scorching on the crop. Picture 3 shows that identical application conditions with the same nozzles the quality of the LF becomes important. The differences between the variances are caused by the quality of LF, in this case the physical characteristic of surface tension. The LF with lower surface tension scorched much more leaves and the result were lower yield. Before buying the LF the quality characteristics have to be checked.

Application at late stadium in winter grain – no problem

The technical development has helped a lot to eliminate any possible damage during the last nitrogen application in winter grain shortly before the ears are appearing. Orifice nozzles, FD nozzles, hose drop or tube drop systems offer the opportunity to apply LF also in the late stadium between 32 – 49/51. There is no difference in the level of raw protein or yield of winter wheat fertilized by granulate or LF.

A couple of scientific researches support these facts.

When the ears have appeared the LF should be applied only by hose drop or tube drop systems. A combination with pesticide application is not possible under these conditions.

Precise application on the target

LF offers a positive opportunity to fulfill the ever increasing environmental consciousness of the farmers and directives from society. With extremely precise calibration and distribution a sustainable application in the field, precisely ending at the field border is achieved.

No uncontrolled application can occur outside the boundaries of the field. New technologies with N-sensors or GPS connection realize an application on partial areas demand, this means precision farming. Meanwhile there are nitrogen stabilized LF available which contribute to positive environmental effects and avoid uncontrolled leaching. FD nozzles are well prepared for partial area application. Changes in the pressure don't influence the droplet size negatively; the extremely coarse drops remain and are excellent for the crop tolerance.

A higher pressure does not affect the impact of the droplets when the droplets touch the leaves. The droplets fall down only by gravity and not by the pressure of the sprayer.

LF and precision farming

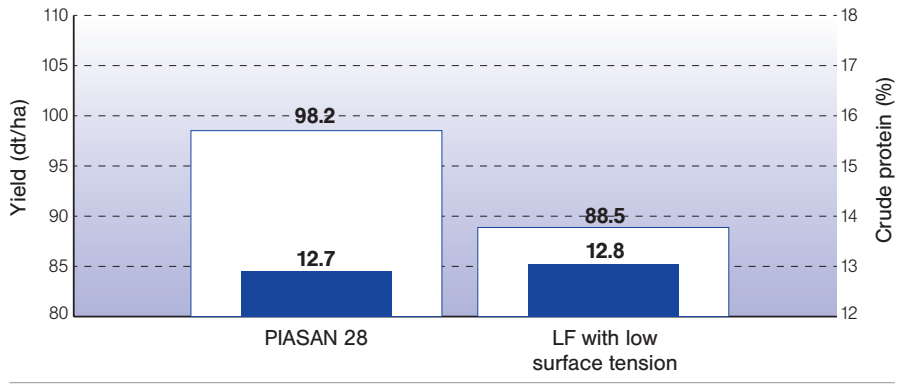
Spreaders for granulate and sprayers for LF are able to apply on partial areas in the field. Sprayers are equipped with valves which can adapt very fast and precise to the crop/ GPS map demand. For instance Vario Select is able to add or reduce number of nozzles without modifying the pressure.

This system allows varying the application rate in a range of 500 % and this at a constant low pressure level and precisely within the working width.

Fertilizer systems for the future

Precision farming is the answer to a lot of economical and environmental questions.
One integral part of this future agriculture will be new technologies which improve the efficiency of nitrogen fertilizer including precision farming via GPS. Further new variances of N fertilizer with more stabilized components support modern agriculture, means saving costs and preserve the environment. Balanced nutrients reduce not only the pollution of environment.

This means also to utilize full virility of fertilizer and to rescue the fertility of the soil. LF is an excellent tool especially due to precise calibration and application. As there is no significant difference between the fertilizers variances it is not the most important question which N fertilizer should be applied. Much more important is to follow up the different application guide lines and to work on the conditions of best practice.



Surface-tension (mN/m)	60..70	20..25
Leaf necrosis (%)	4	13

Picture 3: Relationship between surface extension of LF and the treatment level of the crop, yields and crude protein level, average of 5 tests during 2004 – 2008.

GOOD AGRICULTURAL PRAXIS FOR APPLICATION OF LF

Which crop is not suited to LF application?

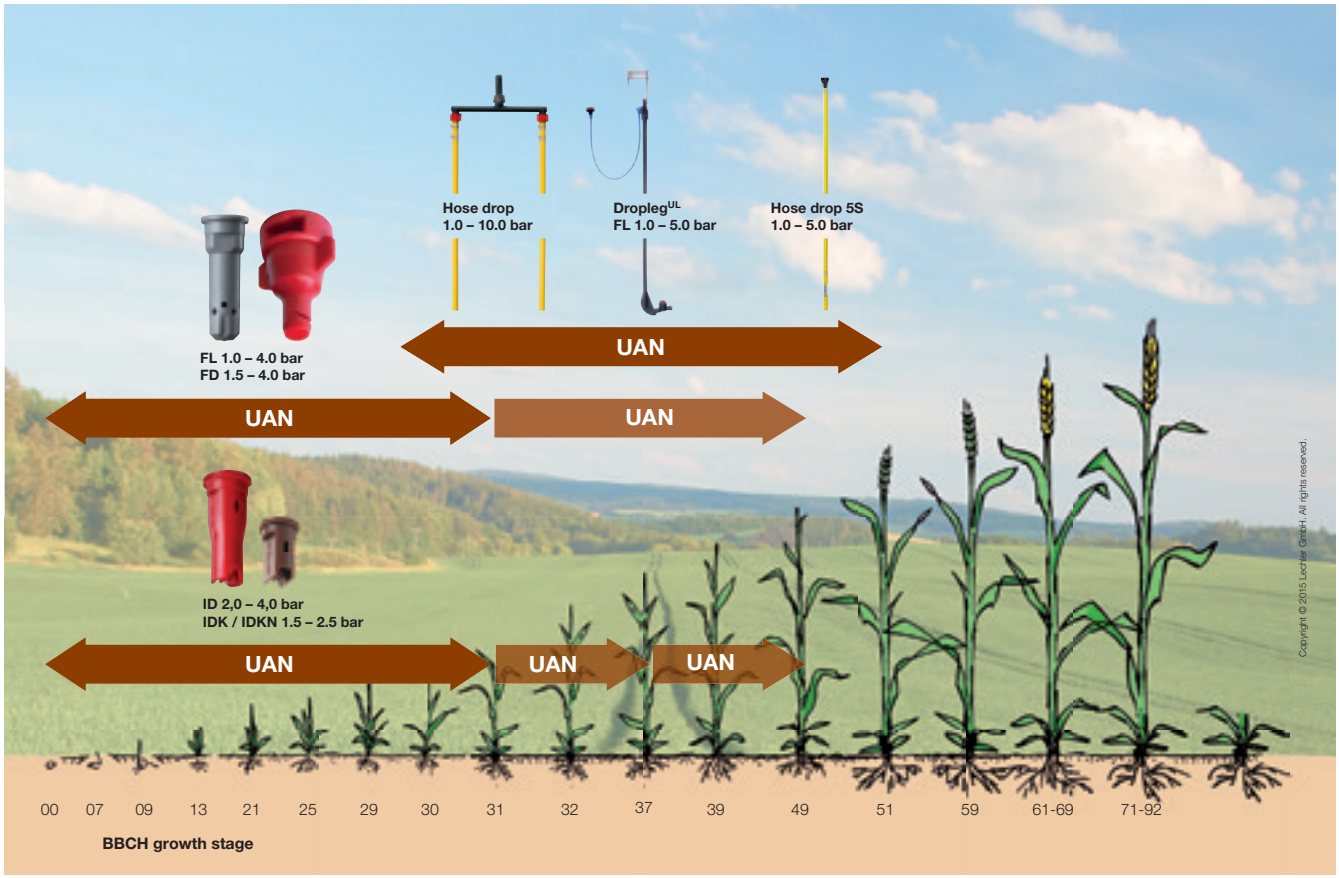
LF can be applied in nearly all crops if the application rate is applied at the right time by the correct technology.

Before the application is started attention has to be paid to the growth stadium of the crop and the application technology.

Optimum conditions are:

- Medium to coarse droplet sizes
- Application into dry crops, preferably in the afternoon, early evening (not onto morning dew or directly after rainy period)
- Wait 1 – 2 days after a rainy period that the waxy layer is regenerated
- External temperature should be in a range of min. -5 ° and max. 25 °Celsius
- Strong dry frozen crop, but not on partially frozen crop or if the process of defrosting has already started
- Mixture water : LF min. in a ratio 3 : 1
- Application before germination max. up to 3 days after seeding
- Pure UAN application onto crop up to 250 l/ha with ID3 or IDK/IDKN. > 250 l/ha with FD.

NOZZLE RECOMMENDATION IN CEREALS



In winter grain LF can be applied during the dormancy period onto the frozen crop, the rate can be 60 – 100 kg N/ha. The crop should have min. 3 – 4 leaves and should pos-ses an excellent strong root system. Further combinations of LF are possible with growth regulators. If the stem elongation has started, the max. rate of LF in combination with pesticides should be max. 50 l/ha LF, density 1.28 kg/m3.
The relation water : LF should be min. 3 : 1. The following spraying jobs against Cercosporella or leaf diseases can be combined with LF. Morpholines should be not in the mixture. If an application of over 50 l/ha LF (f.i. 150 l/ha) in the later vegetation is required, injector nozzles should not be used. Orifice or FD nozzles, DroplegUL, hose/tube drop systems are preferably in use. When the ears are appearing respectively the leaf sheaths are opening LF applications should be done only by Dropleg[UL], hose/tube drop systems to exclude any leaf scorching. In general attention should be paid to the handling instructions of pesticides and the suitability of mixing with LF!

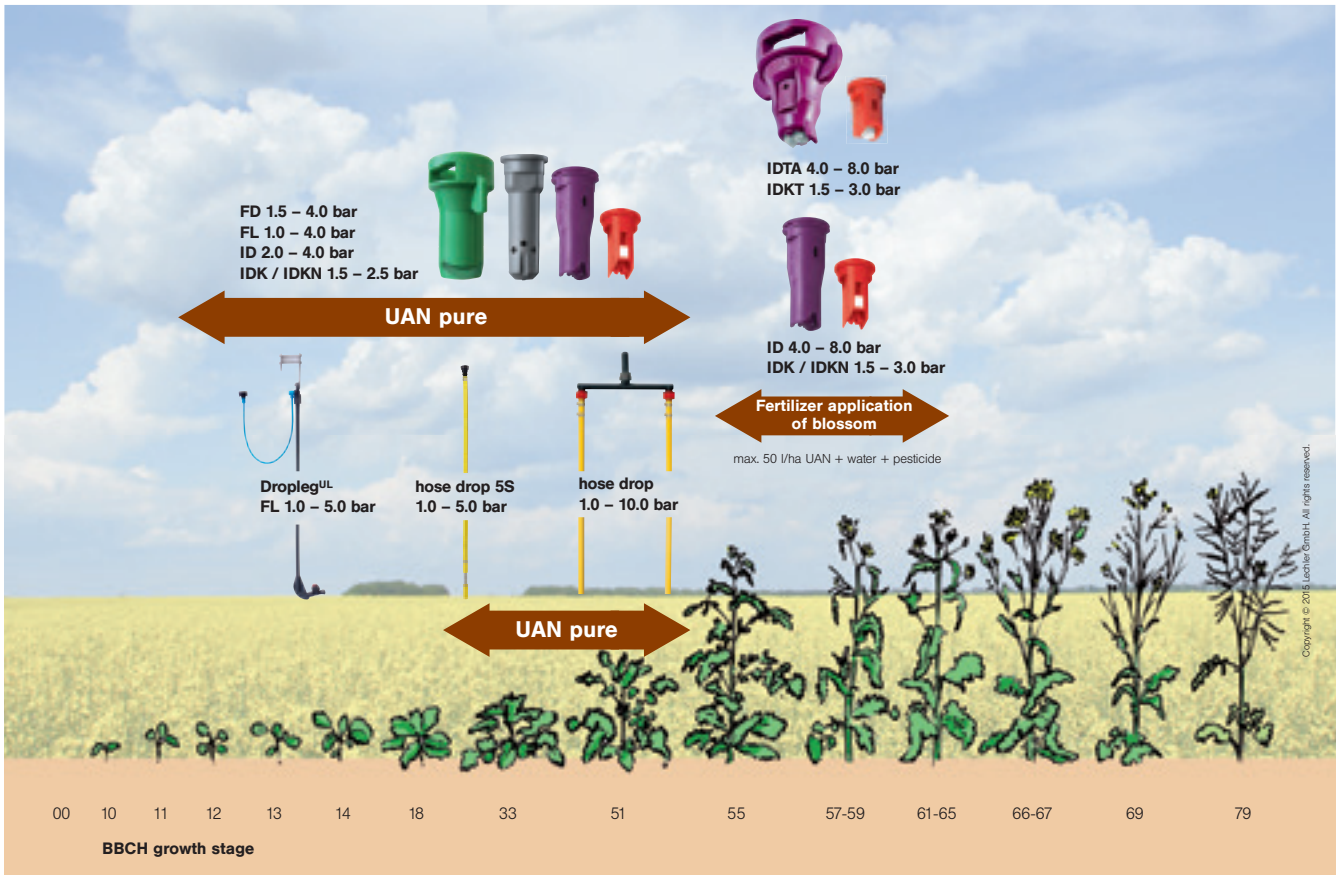
In general, attention has to be paid to the handling instructions of pesticides and the compatibility with LF!

Nozzle recommendation at the beginning of vegetation 150 – 280 l/ha LF:
- FD 03 to 10, PRE
- FL grey with Dosing orifices 1.2/1.5/1.8
- ID3 120-025 to -08
- IDK/IDKN 120-03 to -06

2nd N-application 60 – 170 l/ha pure LF or in combined application of LF + water + PSM:
- FD 03 to 06 (pure LF)
- ID3 120-01 to -05
- IDK/IDKN 120-015 to -06

Final application 140 – 170 l/ha LF:
- FD 03 to 05, PRE
- FL black with Dosing orifices 1.0/1.2 or FL grey with Dosing orifices 1.2/1.5
- Hose drop system 5S with Dosing orifice 1.0/1.2
- Hose drop system with Dosing orifice 0.8
- Dropleg[UL] with FL black and Dosing orifices 1.0/1.2 or FL grey and Dosing orifices 1.2/1.5

NOZZLE RECOMMENDATION IN RAPE SEED



In winter rape in total 200 kg N/ha can be applied, spitted into 2 applications during the vegetation period. This can be done with pure UAN by nozzles or hose/tube drop systems.

Nozzle recommendation at the start of germination 220 – 350 l/ha:

- FD 04 to 10, PRE
- FL grey with Dosing orifices 1.5/1.8
- ID3 120-04 to -08
- IDK 120-05 to -06

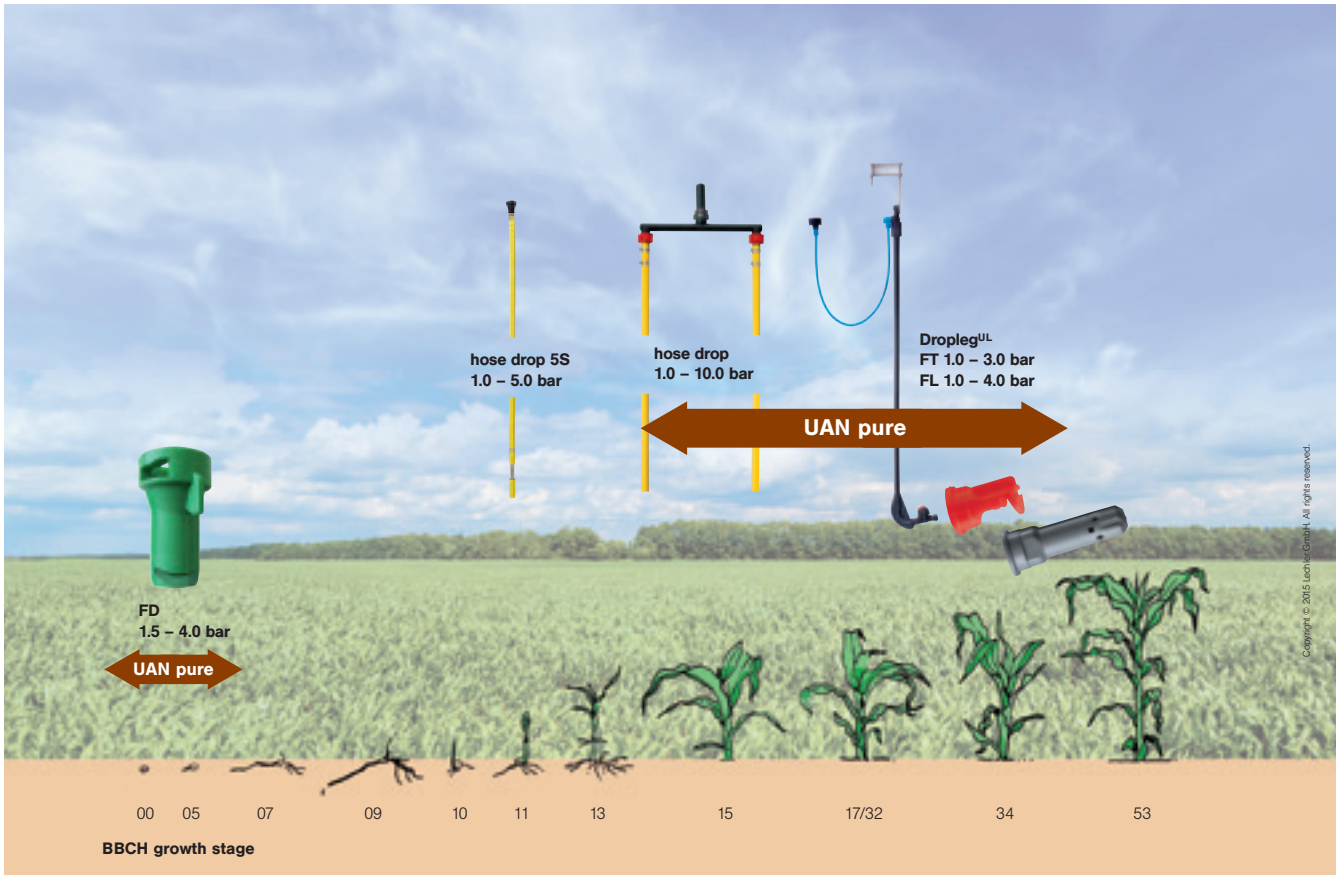
2nd N-application until generation of buds 170 – 280 l/ha LF:

- FD 03 to 08, PRE
- FL grey with Dosing orifices 1.2/1.5/1.8
- Hose drop system 5S with Dosing orifice 1.2
- Hose drop system with Dosing orifice 1.0

Application during flowering 50 l/ha LF + water + fungicides/insecticides:

- IID3 120-025 to -05
- IDTA 120-025 to -05
- IDK/IDKN 120-03 to -06
- IDKT 120-03 to -06

NOZZLE RECOMMENDATION IN CORN



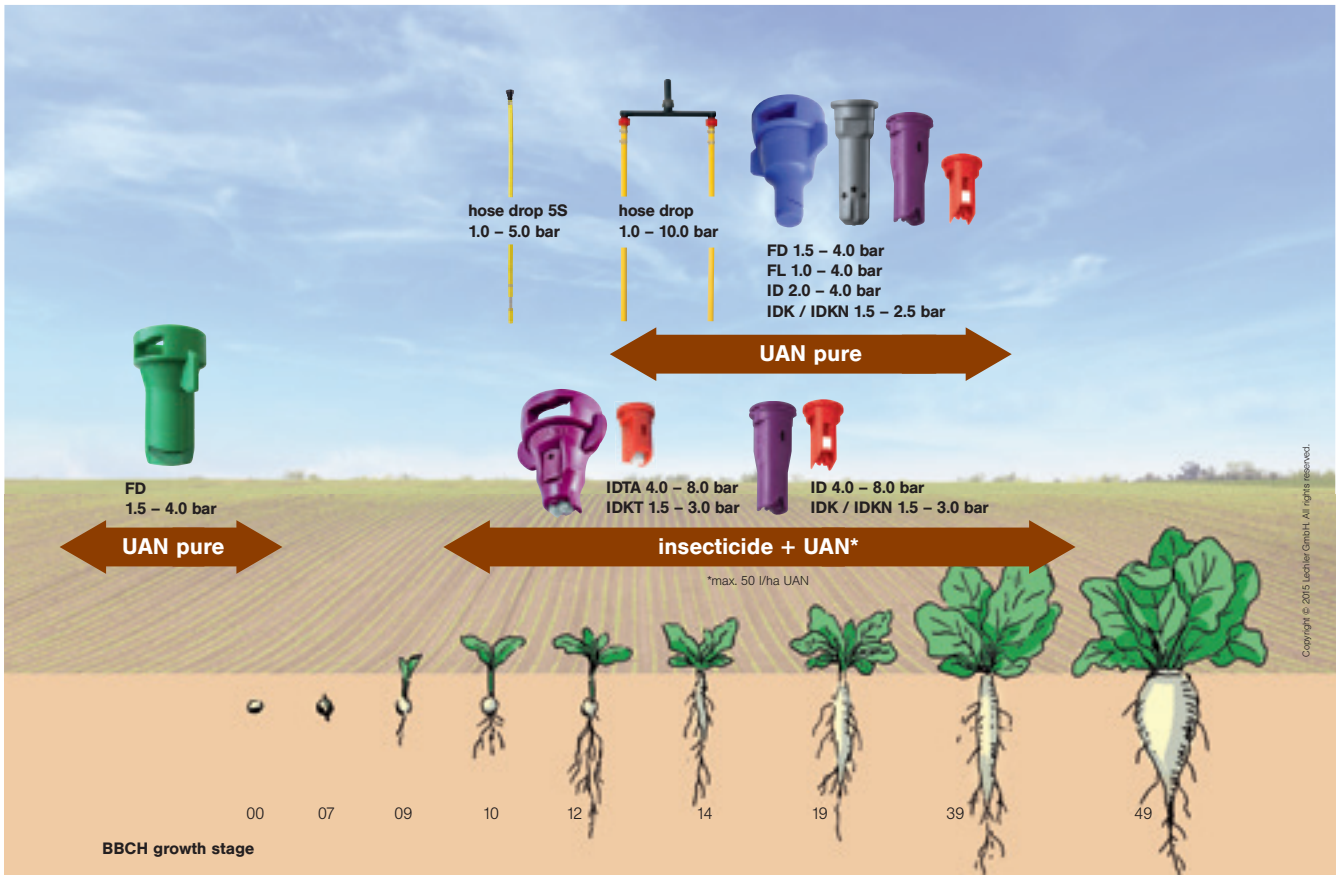
Corn is very sensitive to the application of LF directly onto the leaves. An application before germination in combination with herbicides is no problem. The addition of a dinitrification inhibitor is recommended. Later applications directly into the crop should be done by Dropleg[UL] or hose drop systems.

Nozzle recommendation before seeding until 3 days afterwards 280 – 500 l/ha LF:
- FD 04 to 15, PRE
- ID3 120-04 to -08
- IDK 120-05 to -06

Combined application of LF + pesticides (before germination) 200 – 400 l/ha:
- ID3 120-03 to -08
- IDK/IDKN 120-04 to -06

2nd N-application until 8 leaves stadium 80 – 170 l/ha:
- Hose drop system 5S with Dosing orifice 1.0/1.2
- Hose drop system with Dosing orifice 0.8
- Dropleg[UL] with FT 1.5-408 to 3.0-528 or FL grey with Dosing orifices 1.2/1.5/1.8

NOZZLE RECOMMENDATION IN SUGAR BEETS



In sugar beets the LF can improve the total yield as well as the increase of sugar content compared to granulated fertilizer KAS. With the basic application before seeding up to 120 kg N/ha can be applied. During the vegetation period from 4 leaves stadium onward not more than 40 kg N/ha (≈ 110 l LF, 1.28 density) per application, should be applied after dry periods.

The interval of time to the herbicide applications should be min. 3 days before or after the herbicide application. This aspect is very important if oil adjuvants are applied in the mixture with herbicides. In combination with insecticides LF can be applied to a max. level of 50 l/ha in combination with a water rate of 150 – 200 l/ha.

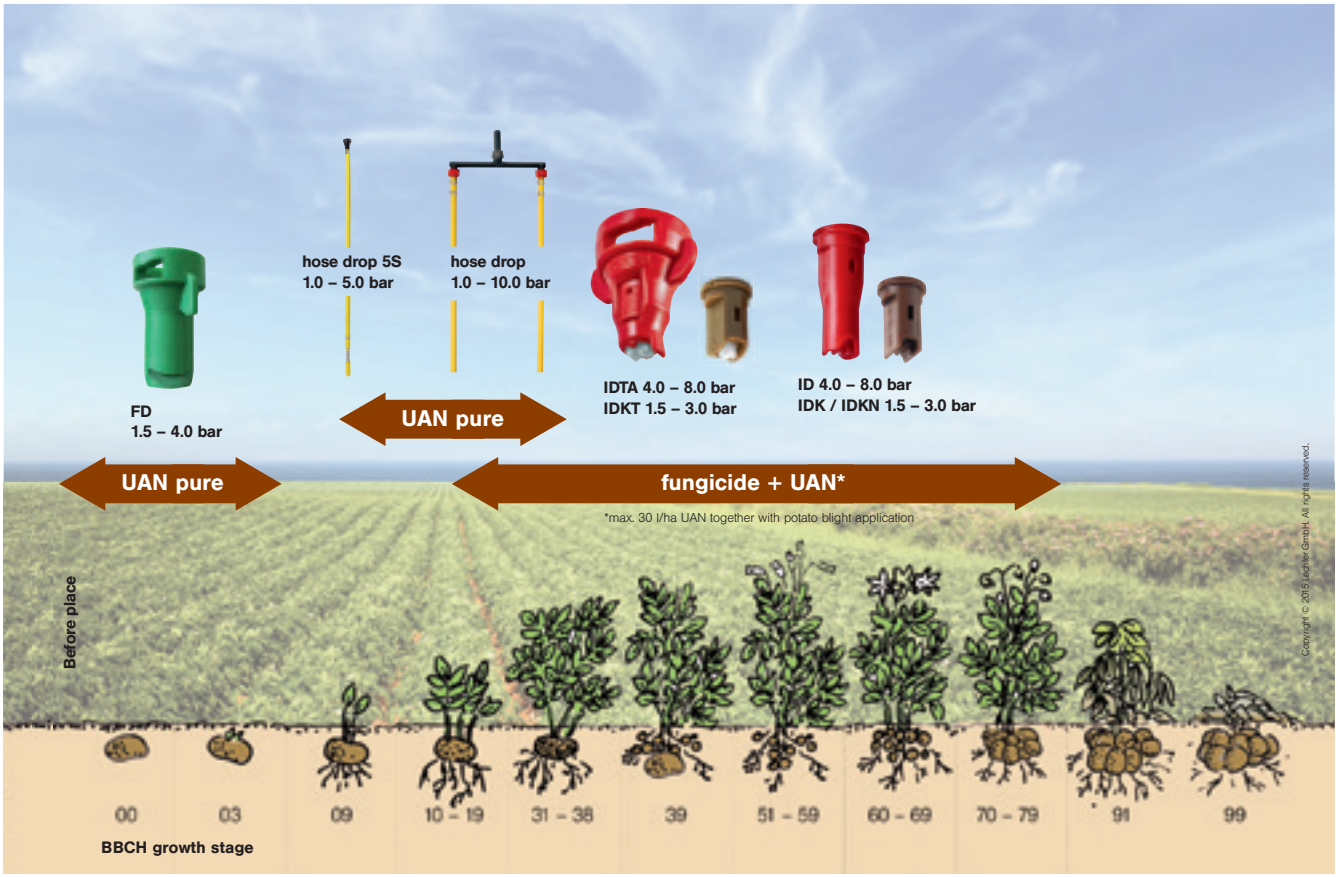
Nozzle recommendation before 1 week of seeding 170 – 335 l/ha (total amount of nitrogen):
- FD 03 to 10, PRE
- FL grey with Dosing orifices 1.2/1.5/1.8
- ID3 120-025 to -08
- IDK/IDKN 120-03 to -06

Until 3 days after seeding 220 l/ha:
- FL grey with Dosing orifices 1.2/1.5
- FD 03 to 06, PRE
- ID3 120-025 to -05
- IDK/IDKN 120-03 to -06

Combined application of LF (max. 50 l/ha) + water + insecticides:
- ID3 120-02 to -03
- IDTA 120-02 to -03
- IDK/IDKN 120-025 to -04
- IDKT 120-025 to -04

2nd N-application from 6 leaves stadium until end of May shortly before the rows are closing 80 – 110 l/ha LF:
- FD 03
- Hose drop system 5S with Dosing orifice 1.0
- Hose drop system with Dosing orifice 0.8
- FL black with Dosing orifices 0.8/1.0
- ID3 120-015 to -03
- IDK/IDKN 120-02 to -04

NOZZLE RECOMMENDATION IN POTATOES



In potatoes the combination of pesticide and LF application is evident to reduce the number of passes.

1. Application before planting
2. Application of 60 l/ha pure LF or in combination with herbicides
3. Add up to 10 kg N/ha LF to every application against Phytoptora

Nozzle recommendation before planting 170 – 335 l/ha LF:

- FD 03 to 10, PRE
- FL grey with Dosing orifices 1.2/1.5/1.8
- ID3 120-025 to -08
- IDK/IDKN 120-03 to -06

2nd N-application 110 – 170 l/ha pure LF or in mixture with water and herbicides:

- FD 03 bis 05 (pure LF), PRE (Pre emerge with Clomazone)
- ID3 120-02 to -05
- IDK/IDKN 120-025 to -06

Before crop cover:

- Hose drop system 5S with Dosing orifice 1.0
- Hose drop system with Dosing orifice 0.8

Combined application of LF (max. 30 l/ha) + water + fungicides:

- ID3 120-025 to -05
- IDTA 120-025 to -05
- IDK/IDKN 120-03 to -06
- IDKT 120-03 to -05

PREPARATION OF THE MIXTURE

LF in combination with pesticides

The coverage on the crop (leaves, stem, a.o.) and the adhesion of pesticides can be improved by adding LF. The adsorption of the pesticides via leaves will be higher. This allows sometimes a reduction of the pesticide input without losing efficacy. Further the addition of LF reduces the thermal drift. A splitting of the LF application into diverse single applications, pure or mixed with pesticides is possible during the complete vegetation period. The combined application saves a lot of costs especially the direct application costs in the high crop care season of a farm.

LF pure

LF nitrogen N or with a phosphorus element NP, can be mixed with pesticides instead of water. Herbicides which are applied relatively early are good partners to mix with LF. The instructions of pesticides manufacturers have to be followed strictly, as effect of chemical may become stronger with LF. The label has to be checked for the possibility of reducing chemicals. Those applications must be sprayed with nozzles and cannot be done by hose/tube drop systems.

Tank mixtures

During the periods of tillering and stem elongation tank cocktails are very common. The relation of water to LF should be at 3 : 1, better 4 or 5 : 1. Mixtures with herbicides, fungicides, insecticides and growth regulators are possible. All the instructions of each component has be taken into account. These instructions allow very often only a maximum rate of 30 l/ha LF or less.

Requirements of tank mixtures with pesticides

- Coincidence of the application period/date
- Compliance of the instructions LF/pesticide
- Physical mixability
- Minimum application rate of 150 l/ha
- Crop tolerance of the mixture
- Spraying with injector nozzles with high drift reduction/coarse droplets

LF partial application

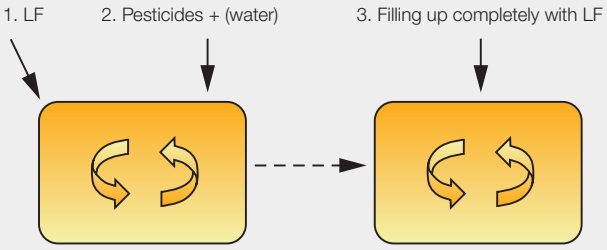
A common procedure in spraying is the addition of 10 – 20 kg N/ha (app. 30 – 60 l/ha LF, dens. 1, 28 kg/m^3). The main target is to capitalize the leaf effect to accelerate the adsorption by the crop, to initiate a sticker effect and to reduce the thermical drift.

Application instructions

Attention has to be taken of detailed manufacturer's instructions with diverse ingredients. This information can be found in the pesticides manuals or in the internet. For LF nitrogen with a density of 1.28 kg/m³ the Lechler spray table UAN is suitable. These tables can be taken from the dealer free of charge or directly from the Lechler website www.lechler-agri.com. For cocktails with water the spray tables for water are relevant.

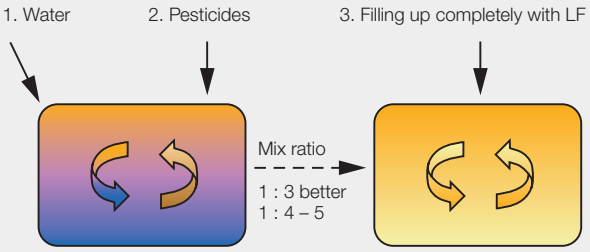
Process of tank fill operation

Pure LF + pesticides



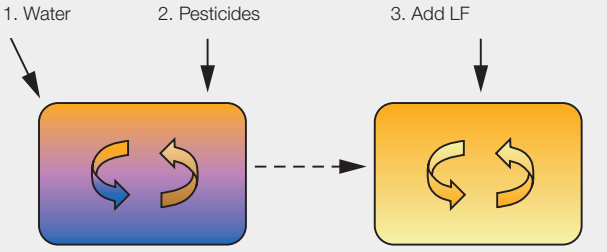
Fill the tank 50 % with LF, add pesticides and fill up then completely with LF, agitation should operate permanently during filling operation and on the way to the field. If requested dissolve at first the pesticides externally with water.

LF + water + pesticides



The mix ratio between LF and water should be min. 1 : 3, better 1 : 4 – 5. First fill up the tank with water, add the pesticides if necessary dissolved externally then fill up completely with LF. The agitation should operate permanently.

LF + pesticide + water



Firstly fill the tank with the total water amount then add the LF 30 – 60 l/ha. The agitation should operate permanently.

BASICS OF NOZZLE TECHNOLOGY FOR PURE LF APPLICATION

LF can be applied easily by state of the art nozzle tips. The choice of the right nozzle type is related on following basic principles:

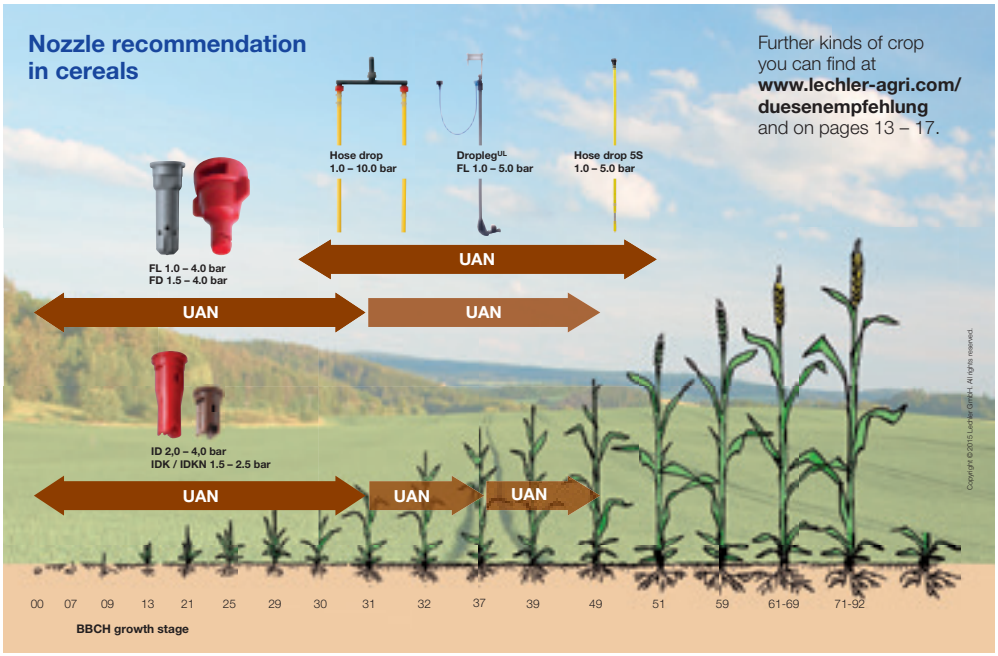
- The better the waxy layer on leaf surfaces of the crop is formed the more gentle coarse droplet application with air injector flat fan nozzles are.
- In advanced growth stadium the crop is more and more sensitive to injector flat fan nozzles or orifice nozzles
- The more the crop is in a sensitive condition increased attention should be paid to the range of application:
  injector flat fan < FL nozzle < FD nozzle < hose/tube drop system

ID3, IDK and IDKN injector flat fan nozzles can apply at lower pressure both LF pure and LF in combination with pesticides or nutrients.

FL and FD nozzles can only apply pure LF, not in combination with pesticides. The advantage is that they are delivering very coarse droplets, which reduces the risk of crop scorching.

Dropleg^{UL} and Hose drop systems 5S guarantee the highest security. They are taken dominantly in the late vegetation period or in worse weather conditions.

If there is nevertheless a necrosis in the crop the plants can compensate and repair this during the following vegetation period. At the beginning of the vegetation period 10 % necrosis is acceptable, later on max. 5 %. At this or below this level there are no consequences regarding yield level.



The LF preservation is getting lower in the following range:

Waxy layer

- Fertilizing onto the blank soil 3 days after seeding
- Grain
- Greenland
- Rapeseed
- **Dry frozen crop or strongly covered by white frost**
- Sugar beets
- Potatoes
- Maize/corn

- Weak waxy layer
- Damaged plants

Growth stages

- 3 days after seeding
- 3 leaves stadium
- High osmotic difference in the plants (strong frost or drought period)
- Relation LF : water = 1 : 3
- High amount of green and the shape of leaves

Consequences for the plants depending on different nozzle technology

Application with hose system
→ Leaf necrosis 0 – 0.5 %

Scientifically initiated application in a wet wheat crop after the appearance of ears
→ Leaf necrosis 8 – 9.5 %

Aligned application technology from LECHLER guarantees and improves the economical result of LF application:

- Reduced drift
- Precise even distribution
- Higher yields
- Reduction of passes in the field
- Improved efficiency of pesticides
- Reduced risk of nitrogen leaching into the ground
- sufficient economical logistics

BASICS OF NOZZLE TECHNOLOGY

Nozzle type	ID3	IDK	IDKN	FD	PRE	FL black/grey for Dropleg[UL]	Hose drop system	Hose drop system 5S
								
Spray pressure bar (size of dosing orifice)	**2.0 – 4.0**	**1.5 – 2.5** **1.0 – 2.5** (04 to 06)	**1.0 – 2.5**	**1.5 – 4.0**	**1.5 – 4.0**	**1.0 – 5.0** (0.8/1.0) **1.0 – 4.0** (1.2) **1.0 – 3.0** (1.5/1.8)	**1.0 – 10.0** (0.8/1.0)	**1.0 – 5.0** (1.0/1.2)

Beware of scorching of the leaves! The risk is the lowest if

- Application is coarse
- Pressure is low
- Nozzle size is big

To avoid scorching of the crop the state of the art plant protection nozzles should be operated in a lower pressure range for LF compared to pesticide application. The percentage of coarse droplets increases, fine droplets are reduced.

Nozzle material and maintenance

The materials POM (Polyoxymethylene) or ceramic are well suited for LF. Steel or brass nozzles cannot be used for LF application. The pressure gauge and control unit should be suitable for the salty LF. When the application is finished the sprayer should be cleaned with a high amount of water.

Advice

LF is a salty and corrosive solution. Galvanized parts, brass, blank standard steel on the sprayer should be protected or preferably not used. The best materials are plastics, stainless steel and well painted steel parts. LF will also clean the sprayer from pesticide residuals; this can cause clogging at the beginning. In addition LF has degreasing characteristics, important for all valves in a sprayer. Pay attention to the operating instructions of the sprayer.

Correction factors for various liquid density

Density of N-solution (kg/l)	0.84	0.96	1.00 Water	1.11 Urea	1.24 ASL	1.28 LF (28) LF-S	1.32 LF (30)	1.38 NP-Solution	1.44	1.50
Correction factor	1.09	1.02	1.00	0.95	0.90	0.88	0.87	0.85	0.83	0.81

For finding the accurate spraying pressure a calibration of the nozzle flow rate is necessary. At lower temperatures the pressure difference between pressure gauge and nozzles is higher.

For the combined application of LF + water + pesticides the spraying tables for water are suitable.

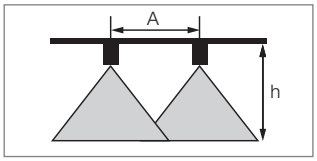
For conversion:

Flow rate water (Table value) x **Correction factor** = **Real flow rate of N-solution**

Density
All table values of flow rates are based on water (density 1.0 kg/l).
Liquids with differing densities should be corrected by the mentioned factors.
The density of LF can be read in the instructions of the LF manufacturer.

Spraying height h: min. – optimum – max. (cm) at a lateral nozzle distance A (m)

	Flat fan nozzle				Orifice nozzle
Nozzle type Spray angle	**ID3/IDK/IDKN 120°**	**ID/IDK 90°**	**PRE 130°**	**FD 130°**	**FL 160°**
A = 0.50 m	40-**50**-70	60-**75**-90	**50-70**	**50-70**	**100**



Air-Injector flat spray nozzles ID3

ID3

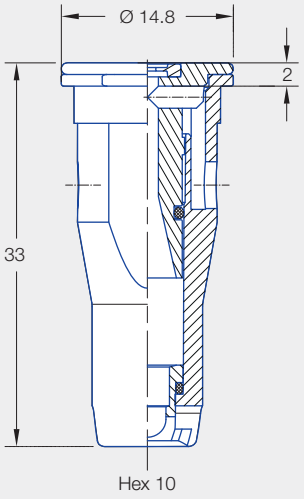
Extremely low-drift, air-injector flat spray nozzle for professional use.

Advantages

- 90 % drift reduction
  - ID-120-025 to 05
- Long injector design ensures high drift stability even at high pressures up to 8 bar
- Timely application even under adverse weather conditions
- Increased workrate due to flexible use over a wide pressure range
  - Adaptation by changing the driving speed and l/ha rate without nozzle changes
- Very good deposition structure and crop penetration

G 1965
G 1966
G 1968
G 1969
G 1970
G 1971
G 1972
G 1973
G 1974

ID3 ID3-C



Nozzle size
01 – 08

Spray angle
120°

Material
POM, ceramic

Pressure range
- ID-01 to -015:
  3 – **4 – 8** bar
- ID-02 to -08:
  2 – **4 – 8** bar
- UAN:
  2 – 4 (– 8) bar

Recommended filters
80 M 01
60 M 02 – 04
25 M 05 – 08

Droplet size
Extreme coarse – medium

Width across flats
10 mm

Application areas

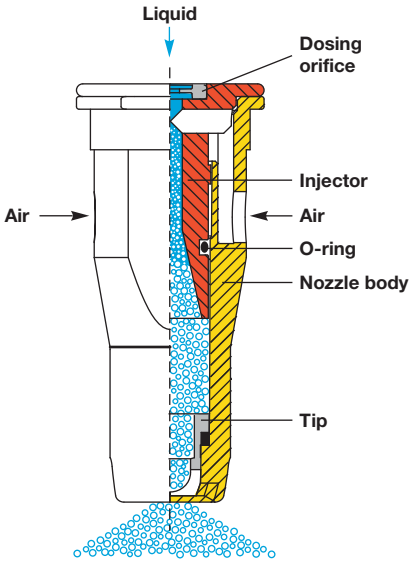
Plant protection products and growth regulators

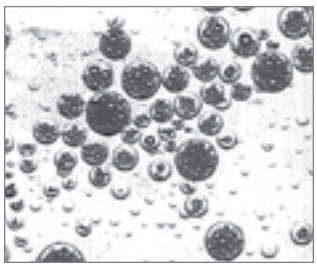
Liquid fertilizer

Border application can be combined with border nozzle IS 80

Golf course

Toolless removable injector





Aeration effect

Spray table for UAN
Air-injector flat spray nozzles ID3

		l/min		UAN l/ha (0.5 m)								
		Water	UAN	5.0 km/h	6.0 km/h	7.0 km/h	8.0 km/h	10.0 km/h	12.0 km/h	14.0 km/h	16.0 km/h	18.0 km/h
ID-120-015 (60 M)	2.0	0.48	0.42	101	84	72	63	50	42	36	32	28
	2.5	0.54	0.48	115	96	82	72	58	48	41	36	32
	3.0	0.59	0.52	125	104	89	78	62	52	45	39	35
	4.0	0.68	0.60	144	120	103	90	72	60	51	45	40
ID-120-02 (60 M)	2.0	0.65	0.57	137	114	98	86	68	57	49	43	38
	2.5	0.73	0.64	154	128	110	96	77	64	55	48	43
	3.0	0.80	0.70	168	140	120	105	84	70	60	53	47
	4.0	0.92	0.81	194	162	139	122	97	81	69	61	54
ID-120-025 (60 M)	2.0	0.81	0.71	170	142	122	107	85	71	61	53	47
	2.5	0.91	0.80	192	160	137	120	96	80	69	60	53
	3.0	0.99	0.87	209	174	149	131	104	87	75	65	58
	4.0	1.15	1.01	242	202	173	152	121	101	87	76	67
ID-120-03 (60 M)	2.0	0.97	0.85	204	170	146	128	102	85	73	64	57
	2.5	1.08	0.95	228	190	163	143	114	95	81	71	63
	3.0	1.19	1.05	252	210	180	158	126	105	90	79	70
	4.0	1.37	1.21	290	242	207	182	145	121	104	91	81
ID-120-04 (60 M)	2.0	1.29	1.14	274	228	195	171	137	114	98	86	76
	2.5	1.44	1.27	305	254	218	191	152	127	109	95	85
	3.0	1.58	1.39	334	278	238	209	167	139	119	104	93
	4.0	1.82	1.60	384	320	274	240	192	160	137	120	107
ID-120-05 (25 M)	2.0	1.61	1.42	341	284	243	213	170	142	122	107	95
	2.5	1.80	1.58	379	316	271	237	190	158	135	119	105
	3.0	1.97	1.73	415	346	297	260	208	173	148	130	115
	4.0	2.28	2.01	482	402	345	302	241	201	172	151	134
ID-120-06 (25 M)	2.0	1.93	1.70	408	340	291	255	204	170	146	128	113
	2.5	2.16	1.90	456	380	326	285	228	190	163	143	127
	3.0	2.36	2.08	499	416	357	312	250	208	178	156	139
	4.0	2.73	2.40	576	480	411	360	288	240	206	180	160
ID-120-08 (25 M)	2.0	2.58	2.27	545	454	389	341	272	227	195	170	151
	2.5	2.88	2.53	607	506	434	380	304	253	217	190	169
	3.0	3.16	2.78	667	556	477	417	334	278	238	209	185
	4.0	3.65	3.21	770	642	550	482	385	321	275	241	214

Example of ordering

Type	+ spray angle	+ int'l nozzle size	+ material	= order number
ID3	120°	025	(POM)	= ID-120-025
ID3	120°	025	C (ceramic)	= ID-120-025 C

Drift reduction: 90/75/50 %

Current list under
www.lechler-agri.com

- Spray pressure at the nozzle tip (gauged with a diaphragm valve)
- The stated liter-per-hectare rates apply to water.
- Prior to each spraying season, verify the table data by gauging the flow rates.
- Make sure that all nozzles have the same settings.

Online nozzle calculator

Apple

Android

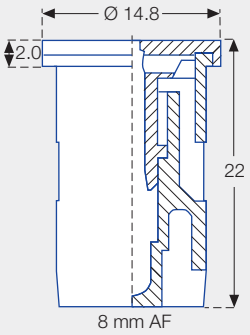
Air-injector flat spray compact nozzles IDK
Air-injector flat spray compact nozzles IDKN

Very low-drift, compact air-injector flat spray nozzle with wide droplet spectrum (from extreme coarse to fine).

Advantages

- 90 % drift reduction
  - IDK 120-05 to 06
  - IDKN 120-03 to 04
- Very low drift and loss-reducing in the pressure range up to 3.0 bar (depending on size)
- Inexpensive alternative to conventional standard nozzles
- Very good deposition structure and crop penetration

G 1661
G 1662
G 1663
G 1683
G 1718
G 1799
G 1800
G 1801
G 1802
G 1936



* IDKN-characteristic: body with white stripe

Nozzle size
01 – 06

Spray angle
90°, 120°

Material
POM, ceramic

Pressure range
- IDK-01 to -03:
  1.5 – 3 – 6 bar
- IDK-04 to -06:
  1 – **1.5 – 3** – 6 bar
- IDKN-03 to -04:
  1 – **1.5 – 3** – 6 bar
- UAN:
  1.5 – 2.5 bar

Recommended filters
80 M 01
60 M 015 – 04
25 M 05 – 06

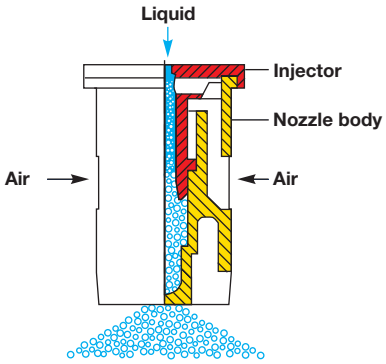
Droplet size
Extreme coarse – fine

Width across flats
8 mm

Application areas

- Plant protection products and growth regulators
- Liquid fertilizer
- Spray frame
- Border application can be combined with border nozzle IDKS 80
- Golf course
- Backpack sprayer
- Greenhouse

Toolless removable injector



Spray table for UAN
Air-injector flat spray compact nozzles IDK / IDKN

		l/min		UAN l/ha 0.5m								
		Water	UAN	5.0 km/h	6.0 km/h	7.0 km/h	8.0 km/h	10.0 km/h	12.0 km/h	14.0 km/h	16.0 km/h	18.0 km/h
IDK 120-015 90-015 (60 M)	1.5	0.42	0.37	89	74	63	56	44	37	32	28	25
	2.0	0.48	0.42	101	84	72	63	50	42	36	32	28
	2.5	0.54	0.48	115	96	82	72	58	48	41	36	32
	3.0	0.59	0.52	125	104	89	78	62	52	45	39	35
	4.0	0.68	0.60	144	120	103	90	72	60	51	45	40
IDK 120-02 90-02 (60 M)	1.5	0.56	0.49	118	98	84	74	59	49	42	37	33
	2.0	0.65	0.57	137	114	98	86	68	57	49	43	38
	2.5	0.73	0.64	154	128	110	96	77	64	55	48	43
	3.0	0.80	0.70	168	140	120	105	84	70	60	53	47
	4.0	0.92	0.81	194	162	139	122	97	81	69	61	54
IDK 120-025 90-025 (60 M)	1.5	0.70	0.62	149	124	106	93	74	62	53	47	41
	2.0	0.81	0.71	170	142	122	107	85	71	61	53	47
	2.5	0.91	0.80	192	160	137	120	96	80	69	60	53
	3.0	0.99	0.87	209	174	149	131	104	87	75	65	58
	4.0	1.15	1.01	242	202	173	152	121	101	87	76	67
IDK 120-03 90-03 IDKN 120-03 (60 M)	1.0*	0.69	0.60	144	120	103	90	72	60	51	45	40
	1.5	0.84	0.74	178	148	127	111	89	74	63	56	49
	2.0	0.97	0.85	204	170	146	128	102	85	73	64	57
	2.5	1.08	0.95	228	190	163	143	114	95	81	71	63
	3.0	1.19	1.05	252	210	180	158	126	105	90	79	70
	4.0	1.37	1.21	290	242	207	182	145	121	104	91	81
IDK IDKN 120-04 (60 M)	1.0	0.91	0.80	192	160	137	120	96	80	69	60	53
	1.5	1.12	0.99	238	198	170	149	119	99	85	74	66
	2.0	1.29	1.14	274	228	195	171	137	114	98	86	76
	2.5	1.44	1.27	305	254	218	191	152	127	109	95	85
	3.0	1.58	1.39	334	278	238	209	167	139	119	104	93
	4.0	1.82	1.60	384	320	274	240	192	160	137	120	107
IDK 120-05 (25 M)	1.0	1.14	1.60	240	200	171	150	120	100	86	75	67
	1.5	1.39	1.00	293	244	209	183	146	122	105	92	81
	2.0	1.61	1.22	341	284	243	213	170	142	122	107	95
	2.5	1.80	1.42	379	316	271	237	190	158	135	119	105
	3.0	1.97	1.58	415	346	297	260	208	173	148	130	115
	4.0	2.28	1.73	482	402	345	302	241	201	172	151	134
IDK 120-06 (25 M)	1.5	1.67	1.47	353	294	252	221	176	147	126	110	98
	2.0	1.93	1.70	408	340	291	255	204	170	146	128	113
	2.5	2.16	1.90	456	380	326	285	228	190	163	143	127
	3.0	2.36	2.08	499	416	357	312	250	208	178	156	139
	4.0	2.73	2.40	576	480	411	360	288	240	206	180	160

* 1.0 bar only for IDKN

Example of ordering

Type	+ spray angle	+ int'l nozzle size	+ material	= order number
IDK	120°	01	(POM)	= IDK 120-01
IDK	120°	01	C (ceramic)	= IDK 120-01 C
IDK	120°	03	(PP)	= IDK 120-03 PP
MultiCap IDK	120°	01	(POM)	= MultiCap IDK 120-01

Drift reduction: 90/75/50 %

Current list under
www.lechler-agri.com

- Spray pressure at the nozzle tip (gauged with a diaphragm valve)
- The stated liter-per-hectare rates apply to water.
- Prior to each spraying season, verify the table data by gauging the flow rates.
- Make sure that all nozzles have the same settings.

Best Protection of IDK/IDKN/IDKS/ IDKT nozzles through long side walls of MultiCap.

Available assembled with IDK-, IDKT- and IDKN nozzle

Online nozzle calculator

Apple

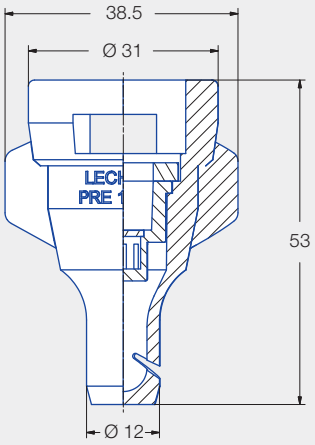
Android

Pre-emergence flat spray nozzle PRE

Extremely low-drift flat spray nozzle for timely application of pre-emergence herbicides.

Advantages
- 95 % drift reduction from 1.5 to 5 bar
- Flexible adaption to buffer zones
- Wide pressure range from 1.5 – 8 bar
- High workrate through simple adaptation of l/ha rate and driving speed
- Timely application even under adverse weather conditions

G 1981



Nozzle size
05

Spray angle
130°

Material
POM

Pressure range
- **1.5 – 8** bar
- UAN: 1.5 – 4 bar

Recommended filters
25 M

Droplet size
Extreme coarse

Application areas

Herbicides pre-emerge

Liquid fertilizer

Golf course

Spray table for UAN
Pre-emergence flat spray nozzle PRE

		l/min		UAN l/ha 0,5m								
		Water	UAN	5.0 km/h	6.0 km/h	7.0 km/h	8.0 km/h	10.0 km/h	12.0 km/h	14.0 km/h	16.0 km/h	18.0 km/h
PRE 130-05 (25 M)	1.5	1.39	1.22	293	244	209	183	146	122	105	92	81
	2.0	1.61	1.42	341	284	243	213	170	142	122	107	95
	2.5	1.80	1.58	379	316	271	237	190	158	135	119	105
	3.0	1.97	1.73	415	346	297	260	208	173	148	130	115
	4.0	2.28	2.01	482	402	345	302	241	201	172	151	134

Example of ordering

Type	+ spray angle	+	int'l nozzle size	+	material	=	order number
PRE	130°		05		(POM)	=	PRE 130-05

Drift reduction: 95/90 %

Current list under
www.lechler-agri.com

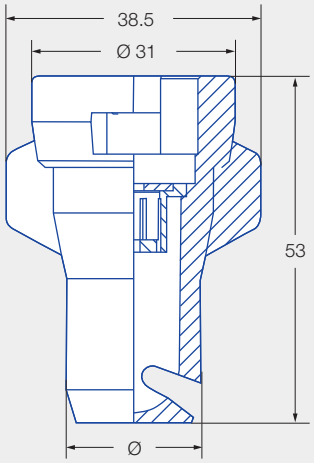
- Spray pressure at the nozzle tip (gauged with a diaphragm valve)
- The stated liter-per-hectare rates apply to water.
- Prior to each spraying season, verify the table data by gauging the flow rates.
- Make sure that all nozzles have the same settings.

Liquid fertilizer nozzles FD

PATENTED

Flat spray nozzle with horizontal spray pattern for uniform cross-distribution.

Advantages
- Gentle liquid fertilizer application thanks to extremely low spray impact
- Minimum risk of crop scorching due to extremely coarse-droplet application
- No streaking due to optimum cross-distribution
- Nozzle in cap for standard bayonet connection system MULTIJET
- Nozzle sizes ISO color-coded



FD 08 – 20 = Ø 20.5
FD 03 – 06 = Ø 12

Nozzle size
03 – 20

Spray angle
130°

Material
POM

Pressure range
- UAN:
1.5 – 4 bar

Recommended filters
60 M FD 03 – 04
25 M FD 05 – 20

Droplet size
Extreme coarse

Application areas

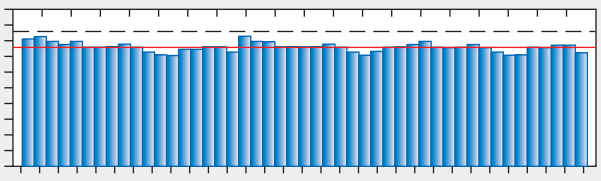
Liquid fertilizer

Greenhouse

Golf course

Toolless removable dosing orifice

FD-04 Cross distribution on patternator (with water)
Spray pressure: 2 bar – spray height: 600mm – CV: 3.4 %



Spray table for UAN
Liquid fertilizer nozzles FD

		l/min		UAN l/ha 0,5m				
		Water	UAN	6.0 km/h	8.0 km/h	10.0 km/h	14.0 km/h	18.0 km/h
FD 03 (60 M)	1.5	0.85	0.75	150	113	90	64	50
	2.0	0.98	0.86	172	129	103	74	57
	3.0	1.20	1.06	212	159	127	91	71
	4.0	1.39	1.22	244	183	146	105	81
FD 04 (60 M)	1.5	1.13	1.00	200	150	120	86	67
	2.0	1.31	1.15	230	173	138	99	77
	3.0	1.60	1.41	282	211	169	121	94
	4.0	1.85	1.63	326	245	196	140	109
FD 05 (25 M)	1.5	1.41	1.24	248	186	149	106	83
	2.0	1.63	1.44	288	216	173	123	96
	3.0	2.00	1.76	352	264	211	151	117
	4.0	2.31	2.03	406	305	244	174	135
FD 06 (25 M)	1.5	1.70	1.49	298	224	179	128	99
	2.0	1.96	1.72	344	258	206	147	115
	3.0	2.40	2.11	422	317	253	181	141
	4.0	2.77	2.44	488	366	293	209	163
FD 08 (25 M)	1.5	2.26	1.99	398	299	239	171	133
	2.0	2.61	2.30	460	345	276	197	153
	3.0	3.20	2.82	563	422	338	241	188
	4.0	3.70	3.25	650	488	390	279	217
FD 10 (25 M)	1.5	2.83	2.49	498	374	299	214	166
	2.0	3.27	2.88	576	432	345	246	192
	3.0	4.00	3.52	704	528	422	302	235
	4.0	4.62	4.07	813	610	488	348	271
FD 15 (25 M)	1.5	4.24	3.73	746	560	448	319	249
	2.0	4.90	4.31	862	647	517	370	288
	3.0	6.00	5.28	1056	792	634	452	352
	4.0	6.93	6.10	1220	915	732	523	407
FD 20 (25 M)	1.5	5.66	4.98	996	747	598	427	332
	2.0	6.53	5.75	1149	862	690	493	383
	3.0	8.00	7.04	1408	1056	845	604	469
	4.0	9.24	8.13	1626	1220	976	697	542

- Spray pressure at the nozzle tip (gauged with a diaphragm valve)
- The stated liter-per-hectare rates apply to UAN (28/1.28 kg/l)
- Nozzle spacing 0.5 m
- Prior to each spraying season, verify the table data by gauging the flow rates
- Make sure that all nozzles have the same settings

Example of ordering

Type	+	int'l nozzle size	+	material	=	order number
FD		06		(POM)	=	FD 06

Intermediate and extension adaptor

Intermediate adaptor* Sys. Lechler Twistloc (092.163.56.00.22.1)
Extension: 22 mm

Intermediate adaptor* Sys. Rau (092.163.56.00.21.0)
Extension: 43 mm

Intermediate adaptor* Sys. Hardi (092.163.56.00.20.1)
Extension: 17 mm

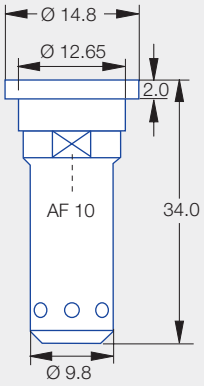
Extension adaptor* System Multijet (092.163.56.00.23.1)
Extension: 32 mm

*incl. gasket

5-orifice nozzles FL (for liquid fertilizers)

Five-orifice nozzle with horizontal spray formation.

Advantages
- Black and gray nozzle sizes can be combined with dosing orifices
- Change in delivery rate by replacing the dosing orifice
- No leaf damage due to extremely coarse droplets



Bore diameter
0.8 – 1.8 mm

Spray angle
160°

Material
- Nozzle body: POM, stainless steel
- Dosing orifice: stainless steel

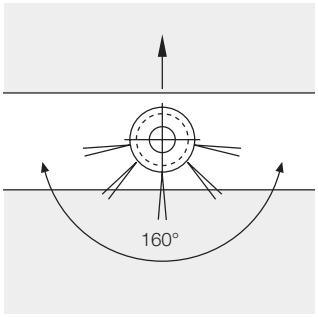
Pressure range
- Dosing orifice 0.8 – 1.0: **1 – 5** bar
- Dosing orifice 1.2: **1 – 4** bar
- Dosing orifice 1.5 – 1.8: **1 – 3** bar

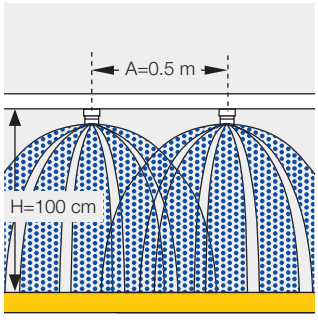
Recommended filters
25 M
slotted strainer

Droplet size
Extreme coarse

Width across flats
10 mm

Application area
Liquid fertilizer





Spray table for UAN
5-orifice nozzles FL (for liquid fertilizers)

Ø mm	bar	l/min		UAN l/ha (0.5m)										
		Water	UAN	5.0 km/h	6.0 km/h	7.0 km/h	8.0 km/h	9.0 km/h	10.0 km/h	11.0 km/h	12.0 km/h	14.0 km/h	16.0 km/h	18.0 km/h
0.8/32	1.0	0.31	0.27	65	55	47	41	37	33	30	27	23	20	18
	2.0	0.43	0.38	91	76	65	57	51	46	41	38	33	29	25
	3.0	0.53	0.47	113	94	80	70	62	56	51	47	40	35	31
	4.0	0.62	0.55	132	110	94	82	73	66	60	55	47	41	37
	5.0	0.69	0.61	146	122	105	91	81	73	67	61	52	46	41
1.0/39	1.0	0.46	0.41	98	81	70	61	54	49	44	41	35	31	27
	2.0	0.65	0.57	137	115	98	86	77	69	63	57	49	43	38
	3.0	0.80	0.71	170	141	121	106	94	85	77	71	61	53	47
	4.0	0.92	0.81	194	163	139	122	108	98	89	81	69	61	54
	5.0	1.03	0.91	218	182	156	137	121	109	99	91	78	68	61
1.2/48	1.0	0.67	0.59	142	118	102	89	79	71	65	59	51	44	39
	2.0	0.95	0.84	202	168	144	126	112	101	92	84	72	63	56
	3.0	1.16	1.03	247	206	176	154	137	123	112	103	88	77	69
	4.0	1.34	1.18	283	237	203	178	158	142	129	118	101	89	79
1.5/59	1.0	0.97	0.86	206	171	147	129	114	103	94	86	74	65	57
	2.0	1.38	1.22	293	244	209	183	163	146	133	122	105	92	81
	3.0	1.69	1.49	358	299	256	224	199	179	163	149	128	112	99
1.8/72	1.0	1.38	1.22	293	244	209	183	163	146	133	122	105	92	81
	2.0	1.96	1.73	415	346	297	260	231	208	189	173	148	130	115
	3.0	2.40	2.12	509	424	364	318	283	255	231	212	182	159	141

- Spray pressure at the nozzle tip (gauged with a diaphragm valve).
- Lateral spacing 0.5 m.
- Prior to each spraying season, verify the table data by gauging the flow rates.
- Make sure that all nozzles have the same settings.
- The stated liter-per-hectare rates apply to UAN (28/1.28 kg/l).

Ordering
When ordering, please include both order numbers, that of the nozzle and that of the dosing orifice.

Recommendation
Please use grey 5-orifice nozzles (order no. 500.179.56.01) for combination with large dosing orifices (1.2, 1.5 and 1.8 mm)

Description	Order. no.
5-orifice nozzles FL (excl. dosing orifice)	
Stainless steel	500.179.16
POM (■ black) for dosing orifices 0.8/1.0/1.2 mm Ø	500.179.56.00
POM (■ grey) for dosing orifices 1.2/1.5/1.8 mm Ø	500.179.56.01
Dosing orifices	
0.8 mm/32 Stainless steel	050.030.1C.00.00
1.0 mm/39 Stainless steel	050.030.1C.01.00
1.2 mm/48 Stainless steel	050.030.1C.03.00
1.5 mm/59 Stainless steell	050.030.1C.02.00
1.8 mm/72 Stainless steel	050.030.1C.04.00

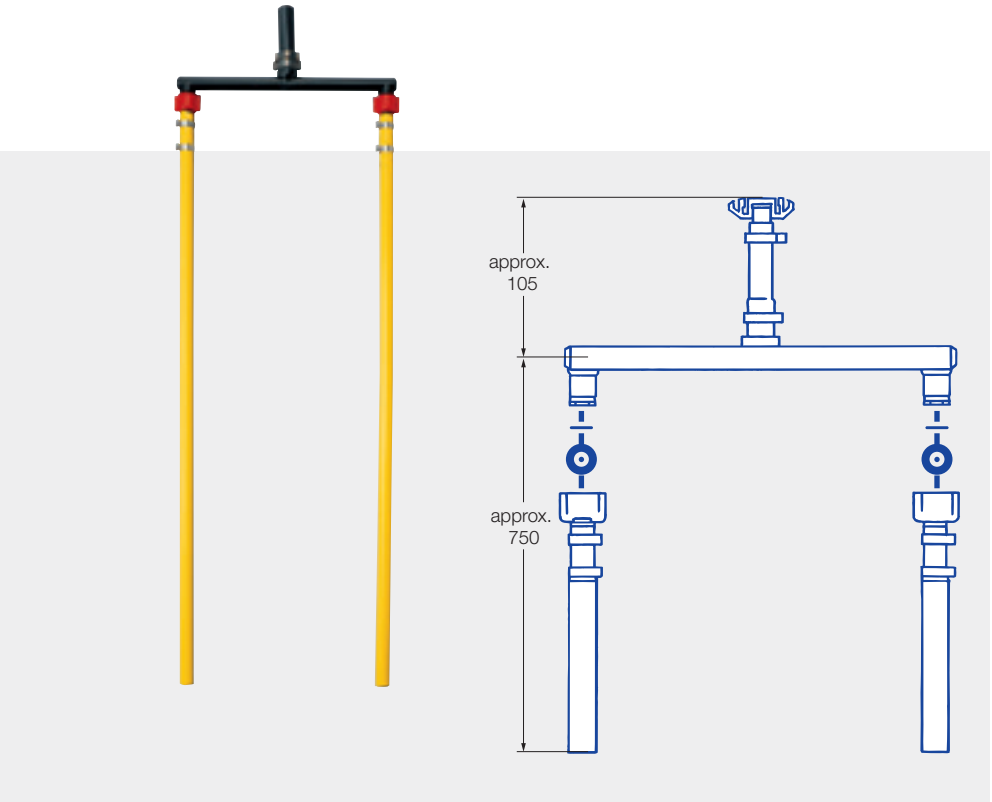
Assembly instruction
Inscription on dosing orifice must face upwards when inserted in the bayonet cap!

Hose drop system for boom sprayers

Hose drop system for late liquid fertilizer application.

Advantages

- No risk of scorching of upper plant parts
- Greater independence from the influence of the weather
- Partial area-specific fertilization with N-sensor
- N-fertilization according to CULTAN method by line deposition on the soil
- Thin tube hoses slide easily through the crop



Tube spacing
0.25 m

Pressure range
- UAN:
1 – 10 bar

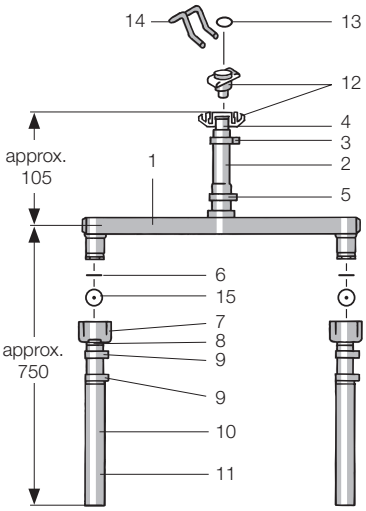
Application area
AHL UAN
Liquid fertilizer

Ø mm *	bar	l/min		UAN l/ha (0.25 m)										
		Water	UAN	5.0 km/h	6.0 km/h	7.0 km/h	8.0 km/h	9.0 km/h	10.0 km/h	11.0 km/h	12.0 km/h	14.0 km/h	16.0 km/h	18.0 km/h
0.8/32	1.0	0.31	0.27	130	108	93	81	72	65	59	54	46	41	36
	2.0	043	0.38	182	152	130	114	101	91	83	76	65	57	51
	3.0	0.53	0.47	226	188	161	141	125	113	103	94	81	71	63
	4.0	0.62	0.55	264	220	189	165	147	132	120	110	94	83	73
	5.0	0.69	0.61	293	244	209	183	163	146	133	122	105	92	81
	6.0	0.76	0.67	322	268	230	201	179	161	146	134	115	101	89
	7.0	0.82	0.72	346	288	247	216	192	173	157	144	123	108	96
	8.0	0.87	0.77	370	308	264	231	205	185	168	154	132	116	103
	10.0	0.96	0.85	408	340	291	255	227	204	185	170	146	128	113
1.0/39	1.0	0.46	0.41	197	164	141	123	109	98	89	82	70	62	55
	2.0	0.65	0.57	274	228	195	171	152	137	124	114	98	86	76
	3.0	0.80	0.70	336	280	240	210	187	168	153	140	120	105	93
	4.0	0.92	0.81	388	324	278	243	216	194	177	162	139	122	108
	5.0	1.03	0.91	437	364	312	273	243	218	199	182	156	137	121
	6.0	1.13	1.00	480	400	343	300	267	240	218	200	171	150	133
	7.0	1.22	1.07	514	428	367	321	285	257	233	214	183	161	143
	8.0	1.30	1.15	552	460	394	345	307	276	251	230	197	173	153
	10.0	1.45	1.27	610	508	435	381	339	305	277	254	218	191	169
1.2/48	2.0	0.95	0.84	403	336	288	252	224	202	183	168	144	126	112
	4.0	1.34	1.18	566	472	405	354	315	283	257	236	202	177	157
	6.0	1.65	1.45	693	580	497	435	387	348	316	290	249	218	193
	8.0	1.90	1.67	802	668	573	501	445	401	364	334	286	251	223
1.5/59	2.0	1.38	1.22	586	488	418	366	325	293	266	244	209	183	163
	4.0	1.95	1.72	826	688	590	516	459	413	375	344	295	258	229
	6.0	2.39	2.10	1008	840	720	630	560	504	458	420	360	315	280
	8.0	2.76	2.43	1166	972	833	729	648	583	530	486	417	365	324
1.8/72	2.0	1.96	1.73	830	692	593	519	461	415	377	346	297	260	231
	4.0	2.77	2.44	1171	976	837	732	651	586	532	488	418	366	325
	6.0	3.39	2.98	1430	1192	1022	894	795	715	650	596	511	447	397
	8.0	3.92	3.45	1656	1380	1183	1035	920	828	753	690	591	518	460

* Additional spray table on request

- Prior to each spraying season verify the table data by gauging the flow rates
- Make sure that in all hoses the same dosing orifice are fitted
- Lateral hose spacing 0.25 m
- Spray pressure at dosing orifice (gauged with a diaphragm valve)
- The stated liter-per-hectare rates apply to UAN (28/1.29 kg/l)

Item	Qty.	Description	Order. no.
1 – 11	1	**Hose drop system complete** (excl. dosing orifices and bayonet cap)	092.160.00.00
1	1	Tee	095.016.56.09.41
2	2	Fabric hose, L = 80 mm	–
3	1	2-eye clamp	095.016.1C.09.44
4	1	Hose shank	095.016.56.07.49
5	1	2-eye clamp	095.009.1C.13.67
6	2	Gasket Ø 11 x Ø 18 x 2.0	095.015.73.06.92
7	2	Threaded cap M 20 x 1.5	095.016.56.09.42
8	2	Hose shank with vent bore	095.009.56.10.44
9	4	Hose clamp	095.009.1C.10.45
10	2	Pipe, L = 686 mm	095.009.50.13.47
11	2	Fabric hose, L = 713 mm	–
12		**Bayonet cap**	
12	1	– System Twistloc, (cf. page 107) (incl. gasket 065.242.73.00)	065.202.56.11.00
12 **13** **13**	1 1 1	– System: MULTIJET etc (cf. page 104) (incl. 3.0 gasket A.402.200.04.00) optional 4.0 mm gasket**	A.402.904.10 095.015.6C.02.85.0
12 **13**	1 1	– System RAU Gasket	095.016.56.05.93.0 095.015.73.04.61.0
14	1	Safety stirrup	095.016.16.05.94.0
15	2	**Dosing orifices**	
		D = 0.8 mm/32; OD = 17.4 mm	050.033.1C.00.00***
		D = 1.0 mm/39; OD = 17.4 mm	050.033.1C.01.00***
		D = 1.2 mm/48; OD = 14.8 mm	050.030.1C.03.00
		D = 1.5 mm/59; OD = 14.8 mm	050.030.1C.02.00
		D = 1.8 mm/72; OD = 14.8 mm	050.030.1C.04.00



** for tight fit of bayonet cap
*** outer diameter 17.4 mm; adapted to Pos. 7

Assembly instruction
Inscription on dosing orifice must face upwards when inserted in the bayonet cap!

Hose drop system 5S

Flexible hose drop system with weight loaded 5-orifice tip for late liquid fertilizer application.

Advantages

- No scorching, because weight-loaded 5-orifice tip is submerged in crop
- 5-orifice tip distributes the liquid fertilizer uniformly in the crop with 0.5 m hose spacing
- In comparison with 0.25 m hose drop system, lower boom loading when pulling through the crop
- Compliance with transport width by ideal adaption of the hose when boom is folded
- Extension as spacer with hose attachment prevents paint damage to the sprayer when folded in
- Including bayonet cap system MULTIJET as standard
- Selection of l/ha rate by nozzle plates

Tube spacing
0.25 and 0.5 m (depending on boom)

Dosing orifice
1.0 and 1.2 mm

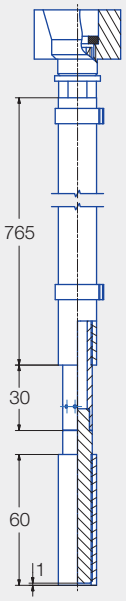
Spray angle
160°

Pressure range
1 – 5 bar

Application area

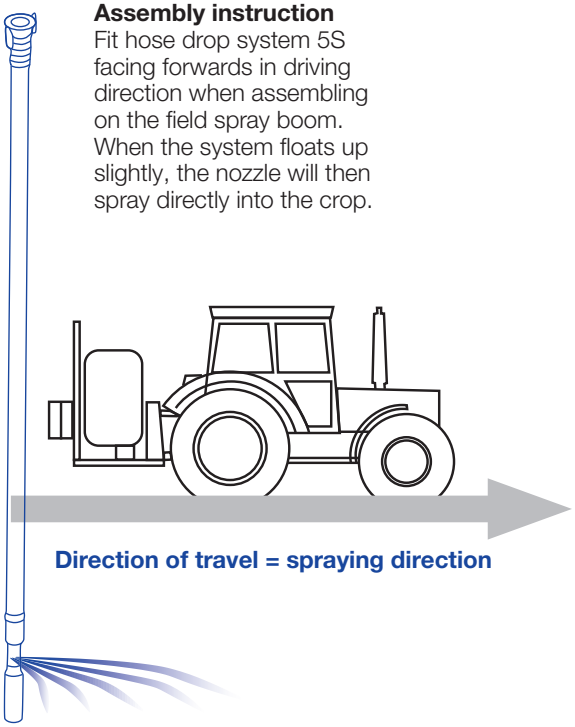
Liquid fertilizer
80 – 250 l/ha UAN

NEW



Assembly instruction
Inscription on dosing orifice must face upwards when inserted in the bayonet cap!

Assembly instruction
Fit hose drop system 5S facing forwards in driving direction when assembling on the field spray boom. When the system floats up slightly, the nozzle will then spray directly into the crop.



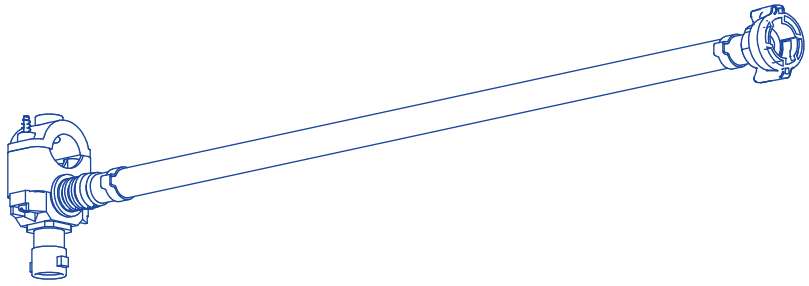
Spray table
Hose drop system 5S

Ø mm	bar	l/min UAN	UAN (28) l/ha 0,5m 5,0 km/h	6,0 km/h	7,0 km/h	8,0 km/h	10,0 km/h	UAN (28) l/ha 0,75m 5,0 km/h	6,0 km/h	7,0 km/h	8,0 km/h	10,0 km/h
1,0/39	1,0	0,41	98	82	70	62	49	66	55	47	41	33
	1,5	0,50	120	100	86	75	60	80	67	57	50	40
	2,0	0,58	139	116	99	87	70	93	77	66	58	46
	2,5	0,65	156	130	111	98	78	104	87	74	65	52
	3,0	0,71	170	141	121	106	85	113	94	81	71	57
	3,5	0,76	182	152	130	114	91	122	101	87	76	61
	4,0	0,82	197	164	141	123	98	131	109	94	82	66
	4,5	0,87	209	174	149	131	104	139	116	99	87	70
	5,0	0,91	218	182	156	137	109	146	121	104	91	73
1,2/48	1,0	0,59	142	118	101	89	71	94	79	67	59	47
	1,5	0,73	175	146	125	110	88	117	97	83	73	58
	2,0	0,84	202	168	144	126	101	134	112	96	84	67
	2,5	0,94	226	188	161	141	113	150	125	107	94	75
	3,0	1,03	246	205	176	154	123	164	137	117	103	82
	3,5	1,11	266	222	190	167	133	178	148	127	111	89
	4,0	1,18	283	236	202	177	142	189	157	135	118	94
	4,5	1,26	302	252	216	189	151	202	168	144	126	101
	5,0	1,32	317	264	226	198	158	211	176	151	132	106

- Prior to each spraying season verify the table data by gauging the flow rates
- Make sure that in all hoses the same dosing orifice are fitted
- Lateral hose spacing 0.5 m
- Spray pressure at dosing orifice (gauged with a diaphragm valve)
- The stated liter-per-hectare rates apply to UAN (28/1.28 kg/l)

Description	Order. no.
Hose drop system 5S	092.173.00
Dosing orifices	
1,0 mm/39 stainless steel	050.030.1C.01.00
1,2 mm/48 stainless steel	050.030.1C.03.00
Relocation kit nozzle holder	092.174.00.00.00.0

NEW



Row width adaption (e.g. corn 0.75 cm row spacing) with relocation kit nozzle holder
3/4'' (25 - 28 cm) on request
assembly to wet boom (20 - 22 mm)

Find further information in our manual:

www.lechler-agri.com/montageanleitungen

VarioSelect®/ VarioSelect® II
2- and 4-way nozzle holder
for variable locationspecific plant protectant, growth regulator and liquid fertilizer applications

2-way or 4-way nozzle holder with pneumatic control for variable application rate control.

Advantages

- Operation optionally in „Vario“ or „Select“ mode
  - Vario: Fully-automatic control of nozzles/nozzle combination and continuously variable adaptation of the application rate and pressure
  - Select: Manual activation and deactivation of individual nozzles/nozzle combinations
- V2 in new more compact design with proven PSV valve technology (see page 100)
- V4 in modular design
- Single valve located directly in front of the nozzle
- Central liquid supply

VarioSelect® II 2-way nozzle holder (pneumatic quick-action connectors optional)

VarioSelect® 4-way nozzle holder (pneumatic quick-action connectors optional)

Note: Fit all valve bodies on the boom in the same nozzle configuration (size, type), perfect operation of the VarioSelect® requires oil in the pneumatic system.

Material
POM, POM fibre glass reinforced, EPDM, Viton, FPM, stainless steel

Pressure range
- Max. 8 bar

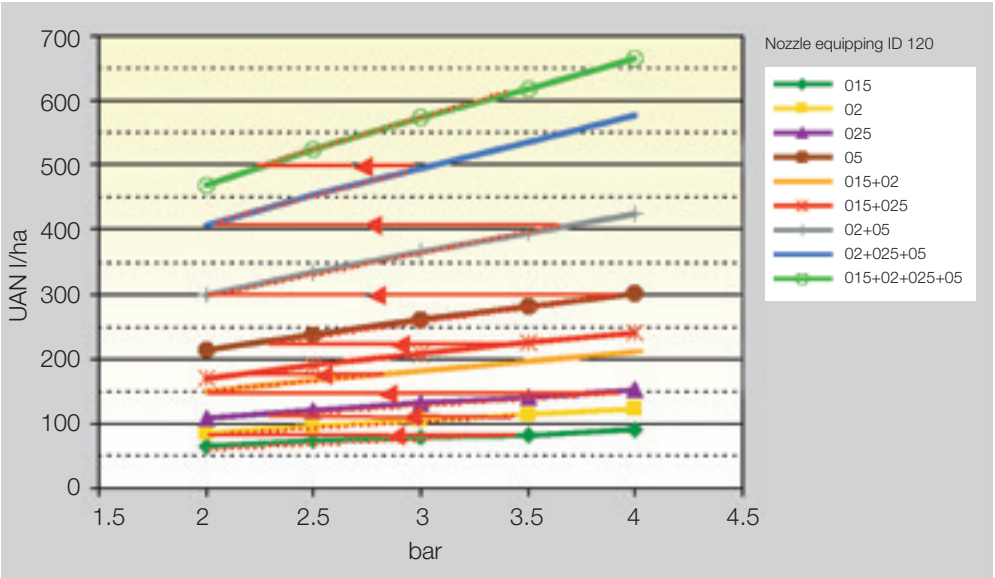
Code for pipe diameter:	
20 mm	20
25 mm	25
1/2“, 22 mm	21
3/4“	27
1“	34

Code for pre-assembled pneumatic quick-action connection (optional):	
90°	A
Basis	B
Y	Y

Others on request.

Example of ordering

V2, 1/2“ with Y pneumatic connection	**065.284.56.21.Y0.0**
V4, 3/4“ with 90° pneumatic connection	**065.286.MN.27.A0.0**



Top Flow II
Electro magnetic flow meter with digital read out

Features:

- Display of overall volume and volume flow
- Temperature range -15 °C to +65 °C
- Measuring accuracy 99 %:
  1“: 8 – 400 l/min
  2“: 25 – 1.100 l/min
  3“: 60 – 2.500 l/min
- Max. pressure: 10 bar at 20 °C

Advantages:

- Self-calibrating
- Independent of density and viscosity
- Simple and fast assembly via manifold and Fixloc connection
- Suitable for UAN and PPP

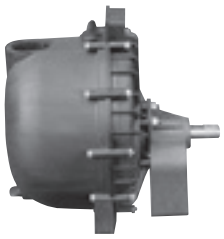
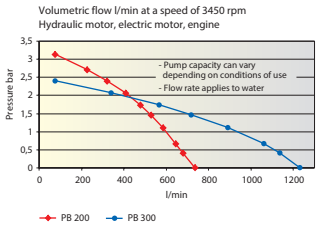
Includes manifold fittings

- **1“, 2“ or 3“ FP manifold**
- **flange with FIXLOC male adapter**
- **FP worm screw clamp**
- **FP gasket EPDM**

Note: Please consider manual.

Order. no.
1“: B.MFM. 100.CO.M
2“: B.MFM. 220.CO.M
3“: B.MFM. 300.CO.M

Pumps

Pumps	Description	Order. no.
 	PB 200 pump with base (excl. motor) Connector: 2” female	095.016.00.07.82
	PB 200 pump with three-phase a.c. motor Connector: BSP 2” female	095.016.00.08.02
	PB 200 pump with hydraulic motor Connector: BSP 2” female	095.016.00.08.01
	PB 200 pump with gasoline engine Connector: 2” female	095.016.00.07.81
	PB 300 pump with base (excl. motor) Connector: BSP 3” female	095.009.00.12.21
	PB 300 pump with three-phase a.c. motor Connector: BSP 3” female	095.009.00.12.20
	PB 300 pump with hydraulic motor Connector: BSP 3” female	095.009.00.12.22

Intermediate and extension adaptor

Intermediate adaptor* Sys. Lechler Twistloc (092.163.56.00.22.1)
Extension: 22 mm

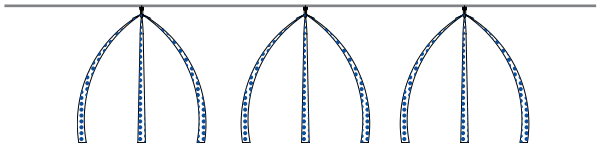
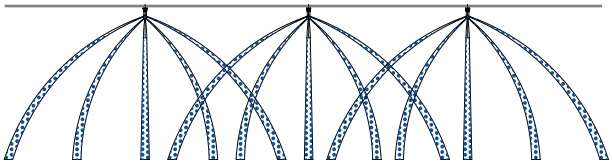
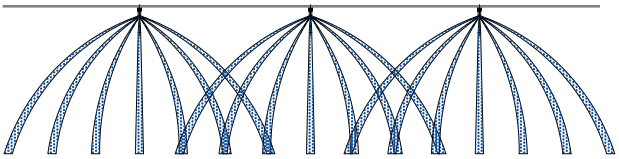
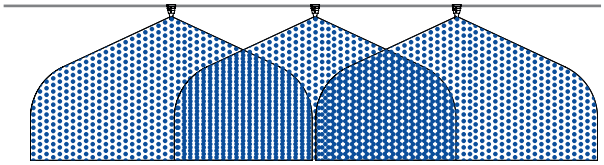
Intermediate adaptor* Sys. Rau (092.163.56.00.21.0)
Extension: 43 mm

Intermediate adaptor* Sys. Hardi (092.163.56.00.20.1)
Extension: 17 mm

Extension adaptor* System Multijet (092.163.56.00.23.1)
Extension: 32 mm

*incl. gasket

Characteristics of different LF nozzle types

	Droplet size	Risk of scorch	Distribution	Harmful impact	Risk of striping effect
3-orifice nozzle, spraying vertical 		+	– –	– –	– –
  Lechler 5-orifice nozzle, spraying horizontal 		+	○	○	○
7-orifice nozzle, spraying horizontal 		–	○	+	○
 Lechler FD liquid fertilizer nozzle, spraying horizontal 		++	++	++	++

++ = excellent / very low
\+ = good / low
I = sufficient
– = high
– – = extremely high / very poor

Unique, optimum transversal distribution and scorch avoiding application using the FD 06:

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www.lechler-agri.com

Nozzle calculator app

Apple

Android

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Edition 06/17 · NaS · EN · PDF · www.dgm-walliser.de · Subject to technical modification.