Quick Check Calibration Calculator

Quickly and easily measures the amount of liquid being dispersed through spray nozzles, and calculates application rates. Also used to adjust nozzle flow rates, determine nozzle accuracy, and evaluate line pressure losses.

WeatherMate Weather Meters

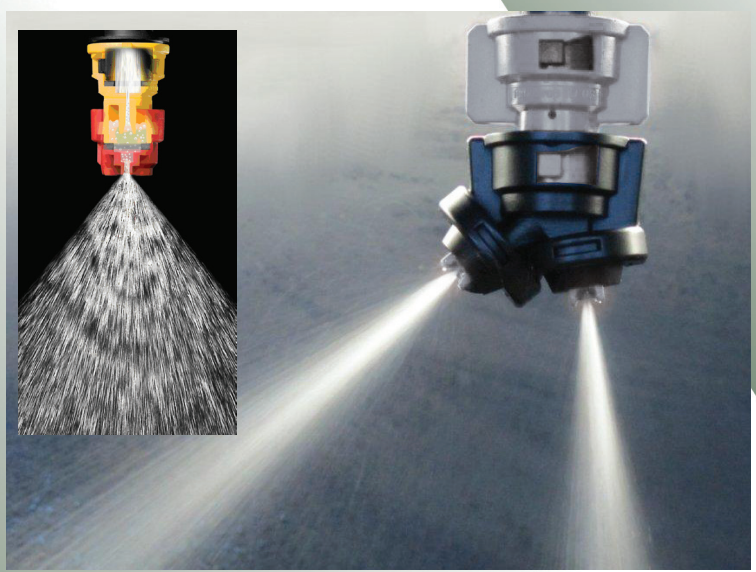
Greenleaf Technologies offers three different hand held instruments to measure wind speed, temperature, wind chill, humidity, dew point, wind direction.

Please see www.greenleafgolf.com for more information, or call 800-881-4832

Nozzles for Turf Spraying

How to Select a Turf Nozzle Understanding Droplet Sizes

Selection Guide



Nozzle selection can be critical when it comes to getting maximum efficacy from expensive application products. Most golf course sprayers come with either extended range flat fan nozzles or wide angle flood nozzles. The extended range nozzle, while providing uniform spray distribution, creates a relatively fine, drift-prone spray droplet spectrum. The flooding style nozzle delivers a coarser droplet, but pattern uniformity is compromised. The TurboDrop® venturi nozzle combines the drift control of a coarse spray (like the flood nozzle) with the uniform spray distribution of a flat fan nozzle. As a result, the TurboDrop® nozzle may be used in more adverse operating conditions and still deliver on-target performance. The droplet spectrum is not overly coarse or too fine, and the air filled droplets have proven to be effective for both contact and systemic chemicals. Most golf courses using the TurboDrop® nozzle use it for every single application on the fairways, greens, tees, and rough.

Droplet Size

Managing droplet size is essential in balancing drift control and chemical efficacy. Droplets on the fine end of the spray spectrum will readily move off target and evaporate, wasting chemical and potentially causing unintended damage. Overly coarse droplets will not adequately cover the leaf surface, resulting in reduced chemical efficacy. The ASABE droplet size categories (see Nozzle Tabulation Chart, next page) can be especially useful when selecting the proper nozzle and pressure for contact sprays. The ASABE system classifies sprays into eight categories from Very Fine (VF) to Ultra Coarse (UC). With Greenleaf air injected nozzles, Medium (M) and Coarse (C) droplets have proven effective at 1.0 GPT rates; Coarse (C) and Very Coarse (VC) droplets work well at 2.0 GPT. Very Fine (VF), Fine (F), Extremely Coarse (XC) and Ultra Coarse (UC) should be avoided in most applications. The VF and F droplets drift, and the XC and UC droplets don't cover very well.

Download TurfCalc Nozzle Calculator app for your phone!

Available on the App Store

Google play

Asymmetric DualFan Nozzles for Colorants, Dyes and Pigments

Greenleaf Asymmetric DualFan Nozzles can be used on self-propelled sprayers and walking booms to apply colorants, dyes and pigments to turf. The unique pattern provides front and back coverage of the leaf blade, which can be further enhanced by alternating every other nozzle on the boom.

Medium to Course droplets are recommended. Sixty-five percent of golf courses use colorants or dyes to enhance the appearance of the turf and to provide earlier growth response. Spraying pigments is a less expensive alternative to over-seeding with ryegrass and the water, growth regulators, and other treatments that rye-grass requires. Fully dormant grass requires a higher rate of colorant (and carrier) to provide the desired effect. If colorants are applied before the turf goes complete-ly dormant, lower rates may be used.

TurboDrop DualFans (TDAD), AirMix DualFans (AMDF), and SprayMax DualFans (DW) have all been used successfully to apply colorant to turf grass. These nozzles can be alternated on the boom to maximize coverage of the leaf surface, effectively spraying the target four times in one pass. Medium to Coarse droplets will deliver an effective combination of coverage and drift control.

Applying Colorant to Dormant Turf

In the photos above, Greenleaf Technologies' DualFan nozzles were used in a totally dormant situation. The nozzles were alternated on the boom to maximize coverage. A higher paint and carrier rate were utilized -10 gpa of paint with 90 gpa of water. In a pre-freezing *pigment* spraying situation, where multiple applications are spread out over a series of weeks, 35 to 40 gpa (carrier rate) might be used with a TurboDrop TDAD06 or TDAD08 nozzle.

Boomless Nozzles Boom40TD / Boom85TD

Boom40TD Boom85TD

The BoomTD is designed for boomless fertilizer applications on golf courses. It reduces the time needed to get the job done, compared to a boom sprayer. The air injection provided by the Venturi reduces off target movement and improves the uniformity of distribution, compared to conventional nozzles.

Nozzles should be mounted at 36-48" height, with enough overlap between the nozzles to prevent streaking. Spray swath may change with changes in pressure.

Heavy streaks indicated by the arrows show uneven pattern distribution for the conventional nozzle.

Boom40TD Application Rate: GPA @ 42" height (13' swath)

Pressure	Flow	Swath Width	Speed (mph) 3	4	5	6	7	8	9	10	11	12	13	14	15
30 psi	3.5 gpm	13 ft.	44.4	33.3	26.7	22.2	19.0	16.7	14.8	13.3	12.1	11.1	10.3	9.5	8.9
40 psi	4.0 gpm	13 ft.	50.8	38.1	30.5	25.4	21.8	19.0	16.9	15.2	13.8	12.7	11.7	10.9	10.2
50 psi*	4.5 gpm	13 ft.	57.1	42.8	34.3	28.6	24.5	21.4	19.0	17.1	15.6	14.3	13.2	12.2	11.4
60 psi*	5.0 gpm	13 ft.	63.5	47.6	38.1	31.7	27.2	23.8	21.2	19.0	17.3	15.9	14.6	13.6	12.7

Boom85TD Application Rate: GPA @ 42" height (16' swath)

Pressure	Flow	Swath Width	Speed (mph) 3	4	5	6	7	8	9	10	11	12	13	14	15
30 psi	7.5 gpm	16 ft.	77.3	58.0	46.4	38.7	33.1	29.0	25.8	23.2	21.1	19.3	17.8	16.6	15.5
40 psi	8.5 gpm	16 ft.	87.7	65.7	52.6	43.8	37.6	32.9	29.2	26.3	23.9	21.9	20.2	18.8	17.5
50 psi*	9.5 gpm	16 ft.	98.0	73.5	58.8	49.0	42.0	36.7	32.7	29.4	26.7	24.5	22.6	21.0	19.6
60 psi*	10.4 gpm	16 ft.	107.3	80.4	64.4	53.6	46.0	40.2	35.8	32.2	29.3	26.8	24.8	23.0	21.5

Boom85TD Nozzles produce a uniform spray pattern distribution for predictable spray application.

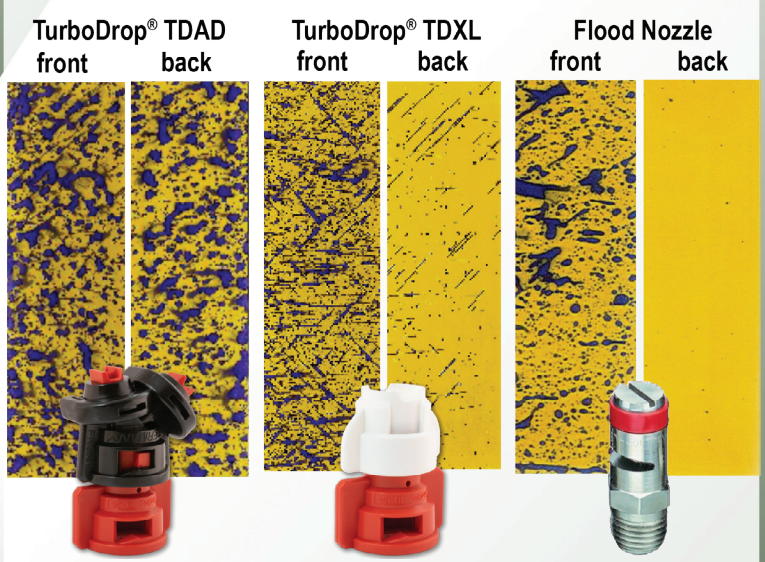
TurboDrop TDAD DualFan
The Ultimate in Coverage

TurboDrop TDAD nozzles split the flow in half, directing it in two 110° fan patterns, targeting the leaf blade from two different angles. Rather than simply spraying straight down, the spray patterns are oriented 10° forward and 50° rearward effectively spraying the turf twice in one pass.

For coverage critical applications like contact fungicides, growth regulators, and foliar amendments, improved coverage can enhance chemical performance.

The spray pattern works with a large variation in boom height. Between 12" and 22" from the turf, the Asymmetric DualFan nozzle has less than 5% variability in spray distribution across the boom length, preventing the striping effect often seen when booms get too close or too far away from the spray target.

When spraying a mostly vertical spray target such as turf grass, it can be difficult to get coverage on the "back side" of the leaf blade. With single fan nozzles, most of the spray ends up on the front side of the leaf (the side that the sprayer is moving toward). With a TurboDrop® Asymmetric DualFan nozzle, spraying both forward and rearward, much better coverage is achieved on the back side.



DualFan nozzles maximize on target performance. Even the best chemistry requires accurate placement. DualFan nozzles minimize drift and provide "two-sided" coverage for maximum chemical efficacy.

DualFan nozzles provide a more consistent, effective droplet size. The droplets are not as coarse as with flood nozzles and are not as fine as with extended range flat fan or conventional twin nozzles. The droplet size is more uniform, providing more useful droplets with fewer ineffective wasted droplets.

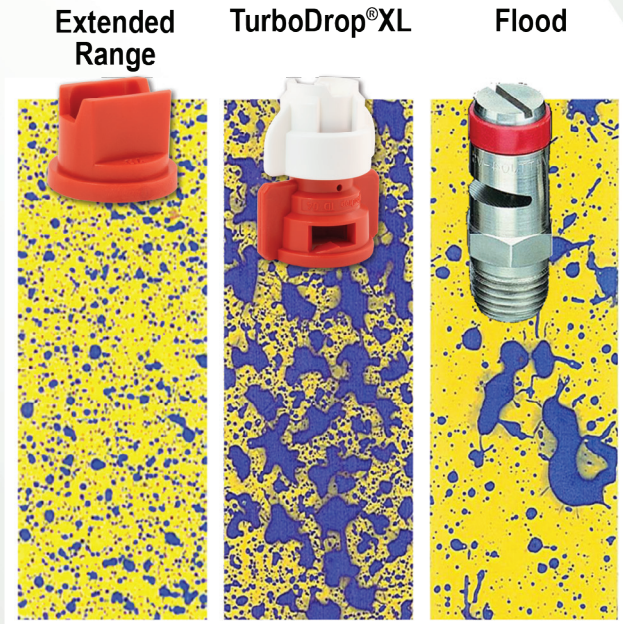
TurboDrop® nozzles eliminate the need for cumbersome shrouds or boom covers that become covered with chemical contamination.

TurboDrop TDXL Turf Nozzles
The Standard in Drift Control

TurboDrop® nozzles use Bernoulli's principle to create a low pressure area which pulls air into the nozzle where it is mixed with the liquid stream to create larger air-filled droplets. The metering orifice determines the flow rate and thus the size of the nozzle. The exit orifice determines the spray pattern of the nozzle.

Most spray nozzles have a single orifice that controls both the flow rate and the pattern. Therefore, when the nozzle begins to wear, both the flow rate and pattern are affected negatively. With the TurboDrop®, the initial metering orifice takes most of the pressure, protecting the life of the pattern orifice, to provide extended pattern uniformity, and prevent striping which can be a major issue on golf course greens.

The TurboDrop® utilizes a large mixing chamber and a patented pulsation dampener to produce a more uniform spray droplet spectrum made up of air-energized droplets. Mixing air into the fluid is significant because it changes the physics of the spray droplet. Air-filled droplets tend to spread out or collapse on the leaf surface rather than just running off, like big, solid-liquid droplets do. Additionally, having air-filled droplets means that there are more droplets in the spray to hit the intended target.



Too Fine (Drift Risk/Loss of Chemical)

Coarse (Good Coverage & Drift Control)

Extremely Coarse (Uneven Coverage)

TurboDrop® nozzles eliminate the need for costly drift control additives that can alter the performance of the chemicals being applied.

TurboDrop® nozzles widen the spraying window. Applicators can get the job done more quickly, spraying faster, spraying in a wider variety of conditions and often spraying with less water.

TurboDrop® nozzles produce air energized droplets. The air expands inside the droplets, accelerating them toward the target. The droplets expand on contact with the leaf surface. Air-filled droplets mean there are more droplets to hit the target.

Greenleaf Nozzles for Golf Course and Turf Grass Applications

Greenleaf nozzles are designed to provide a unique balance of coverage, penetration and drift control. The single fan TurboDrop® TDXL is preferred for soil applied products and for maximum drift control. The DualFan TDAD provides "two-sided" coverage for growth regulators, contact fungicides and other coverage critical applications. Both deliver air-energized spray droplets for maximizing on-target performance, and both nozzles come apart by hand for easy maintenance. They are available in a variety of sizes, with either a poly (TDXL, TDAD) or ceramic metering orifice (TDCXL, TDCAD).

**Also available in ceramic metering orifice.*
Add "C" after TD for Ceramic.

		TDXL Droplet	DualFan Droplet	PSI	GPM	GALLONS PER 1000 SQFT BASED ON 20" NOZZLE SPACING 2 MPH	2.5 MPH	3 MPH	3.5 MPH	4 MPH	4.5 MPH	5 MPH	5.5 MPH	6 MPH
	**TDXL110015*** Standard TurboDrop (Use 100 mesh) **TDAD015*** DualFan TurboDrop (Use 100 mesh)	C	M	30	0.13	0.44	0.35	0.29	0.25	0.22	0.20	0.18	0.16	0.15
		C	M	40	0.15	0.51	0.41	0.34	0.29	0.26	0.23	0.20	0.19	0.17
		M	M	50	0.17	0.57	0.46	0.38	0.33	0.29	0.25	0.23	0.21	0.19
		M	M	60	0.18	0.62	0.50	0.42	0.36	0.31	0.28	0.25	0.23	0.21
		M	M	70	0.20	0.67	0.54	0.45	0.39	0.34	0.30	0.27	0.25	0.22
		M	F	80	0.21	0.72	0.58	0.48	0.41	0.36	0.32	0.29	0.26	0.24
		F	F	100	0.24	0.81	0.65	0.54	0.46	0.40	0.36	0.32	0.29	0.27
	**TDXL11002*** Standard TurboDrop (Use 50 mesh) **TDAD02*** DualFan TurboDrop (Use 100 mesh)	C	C	30	0.17	0.59	0.47	0.39	0.34	0.29	0.26	0.24	0.21	0.20
		C	M	40	0.20	0.68	0.54	0.45	0.39	0.34	0.30	0.27	0.25	0.23
		M	M	50	0.22	0.76	0.61	0.51	0.43	0.38	0.34	0.30	0.28	0.25
		M	M	60	0.24	0.83	0.67	0.56	0.48	0.42	0.37	0.33	0.30	0.28
		M	M	70	0.26	0.90	0.72	0.60	0.51	0.45	0.40	0.36	0.33	0.30
		M	F	80	0.28	0.96	0.77	0.64	0.55	0.48	0.43	0.38	0.35	0.32
		F	F	100	0.32	1.08	0.86	0.72	0.61	0.54	0.48	0.43	0.39	0.36
	**TDXL110025*** Standard TurboDrop (Use 50 mesh) **TDAD025*** DualFan TurboDrop (Use 100 mesh)	VC	C	30	0.22	0.74	0.59	0.49	0.42	0.37	0.33	0.29	0.27	0.25
		VC	C	40	0.25	0.85	0.68	0.57	0.49	0.43	0.38	0.34	0.31	0.28
		C	M	50	0.28	0.95	0.76	0.63	0.54	0.48	0.42	0.38	0.35	0.32
		M	M	60	0.31	1.04	0.83	0.69	0.59	0.52	0.46	0.42	0.38	0.35
		M	M	70	0.33	1.12	0.90	0.75	0.64	0.56	0.50	0.45	0.41	0.37
		M	M	80	0.35	1.20	0.96	0.80	0.69	0.60	0.53	0.48	0.44	0.40
		M	F	100	0.40	1.34	1.08	0.90	0.77	0.67	0.60	0.54	0.49	0.45
	**TDXL11003*** Standard TurboDrop (Use 50 mesh) **TDAD03*** DualFan TurboDrop (Use 50 mesh)	XC	C	30	0.26	0.88	0.71	0.59	0.50	0.44	0.39	0.35	0.32	0.29
		VC	C	40	0.30	1.02	0.82	0.68	0.58	0.51	0.45	0.41	0.37	0.34
		C	M	50	0.34	1.14	0.91	0.76	0.65	0.57	0.51	0.46	0.41	0.38
		C	M	60	0.37	1.25	1.00	0.83	0.71	0.62	0.56	0.50	0.45	0.42
		M	M	70	0.40	1.35	1.08	0.90	0.77	0.67	0.60	0.54	0.49	0.45
		M	M	80	0.42	1.44	1.15	0.96	0.82	0.72	0.64	0.58	0.52	0.48
		M	F	100	0.47	1.61	1.29	1.08	0.92	0.81	0.72	0.65	0.59	0.54
	**TDXL11004*** Standard TurboDrop (Use 50 mesh) **TDAD04*** DualFan TurboDrop (Use 50 mesh)	XC	C	30	0.35	1.18	0.94	0.79	0.67	0.59	0.52	0.47	0.43	0.39
		VC	C	40	0.40	1.36	1.09	0.91	0.78	0.68	0.60	0.54	0.49	0.45
		C	M	50	0.45	1.52	1.22	1.01	0.87	0.76	0.68	0.61	0.55	0.51
		C	M	60	0.49	1.67	1.33	1.11	0.95	0.83	0.74	0.67	0.61	0.56
		M	M	70	0.53	1.80	1.44	1.20	1.03	0.90	0.80	0.72	0.65	0.60
		M	M	80	0.57	1.92	1.54	1.28	1.10	0.96	0.85	0.77	0.70	0.64
		M	M	100	0.63	2.15	1.72	1.43	1.23	1.08	0.96	0.86	0.78	0.72
	**TDXL11005*** Standard TurboDrop (Use 24 mesh) **TDAD05*** DualFan TurboDrop (Use 50 mesh)	XC	VC	30	0.43	1.47	1.18	0.98	0.84	0.74	0.65	0.59	0.54	0.49
		XC	C	40	0.50	1.70	1.36	1.13	0.97	0.85	0.76	0.68	0.62	0.57
		VC	C	50	0.56	1.90	1.52	1.27	1.09	0.95	0.84	0.76	0.69	0.63
		VC	M	60	0.61	2.08	1.67	1.39	1.19	1.04	0.93	0.83	0.76	0.69
		C	M	70	0.66	2.25	1.80	1.50	1.29	1.12	1.00	0.90	0.82	0.75
		C	M	80	0.71	2.40	1.92	1.60	1.37	1.20	1.07	0.96	0.87	0.80
		M	M	100	0.79	2.69	2.15	1.79	1.54	1.34	1.19	1.08	0.98	0.90
	**TDXL11006*** Standard TurboDrop (Use 24 mesh) **TDAD06*** DualFan TurboDrop (Use 50 mesh)	XC	VC	30	0.52	1.77	1.41	1.18	1.01	0.88	0.79	0.71	0.64	0.59
		XC	VC	40	0.60	2.04	1.63	1.36	1.17	1.02	0.91	0.82	0.74	0.68
		XC	C	50	0.67	2.28	1.82	1.52	1.30	1.14	1.01	0.91	0.83	0.76
		VC	C	60	0.73	2.50	2.00	1.67	1.43	1.25	1.11	1.00	0.91	0.83
		VC	C	70	0.79	2.70	2.16	1.80	1.54	1.35	1.20	1.08	0.98	0.90
		C	M	80	0.85	2.88	2.31	1.92	1.65	1.44	1.28	1.15	1.05	0.96
		M	M	100	0.95	3.23	2.58	2.15	1.84	1.61	1.43	1.29	1.17	1.08
	**TDXL11008*** Standard TurboDrop (Use 24 mesh) **TDAD08*** DualFan TurboDrop (Use 24 mesh)	XC	VC	30	0.69	2.36	1.88	1.57	1.35	1.18	1.05	0.94	0.86	0.79
		XC	VC	40	0.80	2.72	2.18	1.81	1.55	1.36	1.21	1.09	0.99	0.91
		XC	C	50	0.89	3.04	2.43	2.03	1.74	1.52	1.35	1.22	1.11	1.01
		XC	C	60	0.98	3.33	2.67	2.22	1.90	1.67	1.48	1.33	1.21	1.11
		VC	C	70	1.06	3.60	2.88	2.40	2.06	1.80	1.60	1.44	1.31	1.20
		VC	M	80	1.13	3.85	3.08	2.56	2.20	1.92	1.71	1.54	1.40	1.28
		C	M	100	1.26	4.30	3.44	2.87	2.46	2.15	1.91	1.72	1.56	1.43
	**TDXL11010*** Standard TurboDrop (Use 24 mesh) **TDAD10*** DualFan TurboDrop (Use 24 mesh)	XC	XC	30	0.87	2.94	2.36	1.96	1.68	1.47	1.31	1.18	1.07	0.98
		XC	XC	40	1.00	3.40	2.72	2.27	1.94	1.70	1.51	1.36	1.24	1.13
		XC	VC	50	1.12	3.80	3.04	2.53	2.17	1.90	1.69	1.52	1.38	1.27
		XC	VC	60	1.22	4.16	3.33	2.78	2.38	2.08	1.85	1.67	1.51	1.39
		XC	C	70	1.32	4.50	3.60	3.00	2.57	2.25	2.00	1.80	1.64	1.50
		VC	C	80	1.41	4.81	3.85	3.21	2.75	2.40	2.14	1.92	1.75	1.60
		VC	M	100	1.58	5.38	4.30	3.58	3.07	2.69	2.39	2.15	1.95	1.79
	**AMDF12** DualFan (Use 24 mesh)		VC	30	1.04	3.53	2.83	2.36	2.02	1.77	1.57	1.41	1.28	1.18
			C	40	1.20	4.08	3.26	2.72	2.33	2.04	1.81	1.63	1.48	1.36
			C	50	1.34	4.56	3.65	3.04	2.61	2.28	2.03	1.82	1.66	1.52
			C	60	1.47	5.00	4.00	3.33	2.86	2.50	2.22	2.00	1.82	1.67
			M	70	1.59	5.40	4.32	3.60	3.08	2.70	2.40	2.16	1.96	1.80
			M	80	1.70	5.77	4.62	3.85	3.30	2.88	2.56	2.31	2.10	1.92
			M	90	1.80	6.12	4.90	4.08	3.50	3.06	2.72	2.45	2.23	2.04
	**TDXL11015*** Standard TurboDrop (Use 24 mesh) **TDAD15*** DualFan TurboDrop (Use 24 mesh)			30	1.30	4.42	3.53	2.94	2.52	2.21	1.96	1.77	1.61	1.47
				40	1.50	5.10	4.08	3.40	2.91	2.55	2.27	2.04	1.85	1.70
				50	1.68	5.70	4.56	3.80	3.26	2.85	2.53	2.28	2.07	1.90
				60	1.84	6.25	5.00	4.16	3.57	3.12	2.78	2.50	2.27	2.08
				70	1.98	6.75	5.40	4.50	3.86	3.37	3.00	2.70	2.45	2.25
				80	2.12	7.21	5.77	4.81	4.12	3.61	3.21	2.88	2.62	2.40
				100	2.37	8.06	6.45	5.38	4.61	4.03	3.58	3.23	2.93	2.69

Droplet size classifications are rated on ASABE 572.1