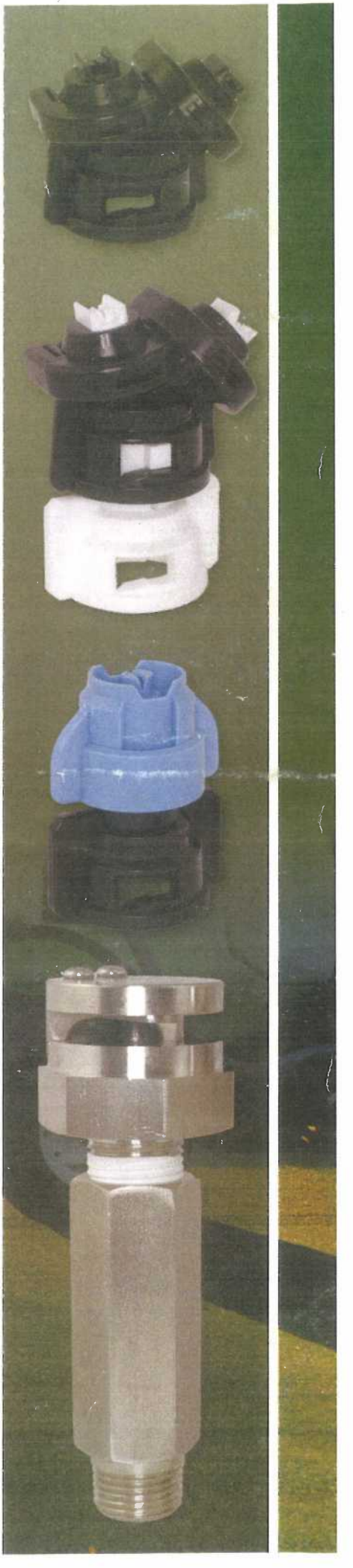
GREENLEAF
TECHNOLOGIES

SPRAY NOZZLES AND ACCESSORIES



GCSAA
GOLF COURSE SUPERINTENDENTS ASSOCIATION OF AMERICA

(800) 881-4830 • www.GreenleafGolf.com

Maximizing Coverage and Minimizing Drift on the Golf Course



Greenleaf nozzles have been proven for over 18 years in the widest variety of golf course applications.
Superintendents do not need a different nozzle for every type of application.

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.

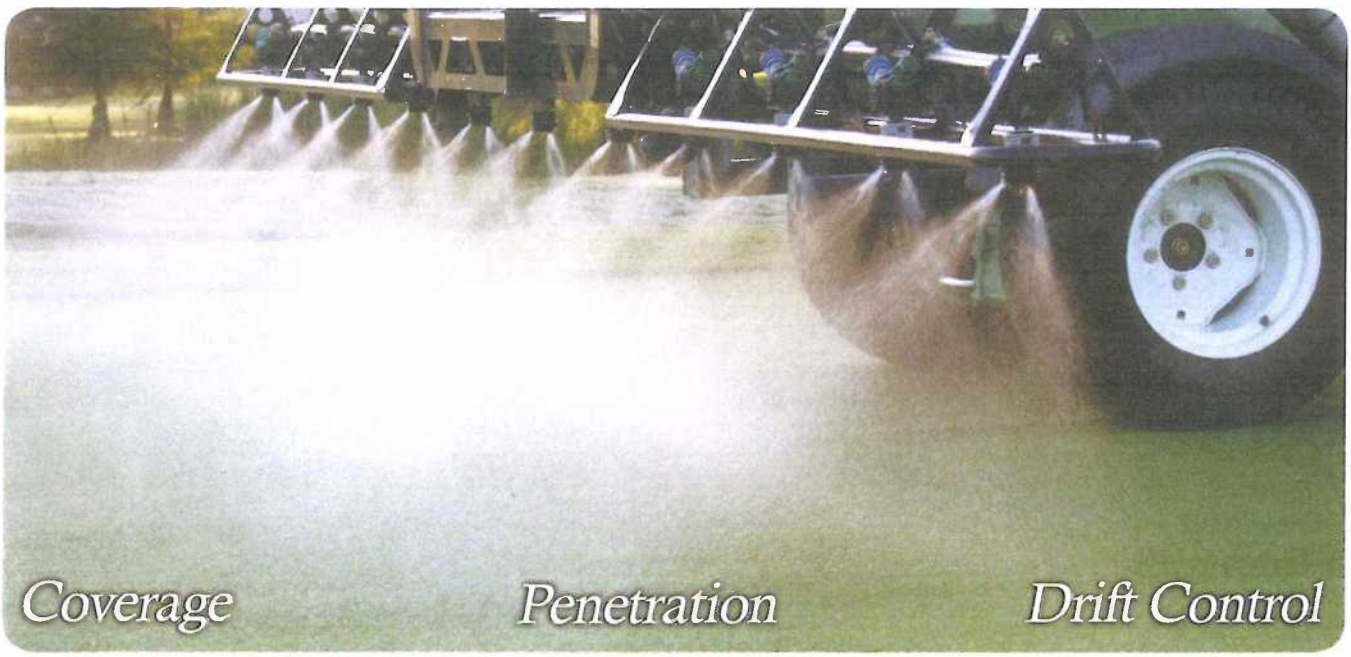
DualFan nozzles help prevent striping.
The asymmetric pattern allows for greater variability in boom height, while maintaining uniform spray distribution across the total spray swath.

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.

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 hide the nozzles and become covered with chemical contamination.



The TurboDrop® nozzle was developed over 20 years ago to improve coverage, reduce runoff and maximize efficiency with plant protection materials. Its combination of excellent drift control and uniform spray coverage make it the perfect choice for the myriad of spray applications on the golf course.

Nozzle Options for Turf

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.

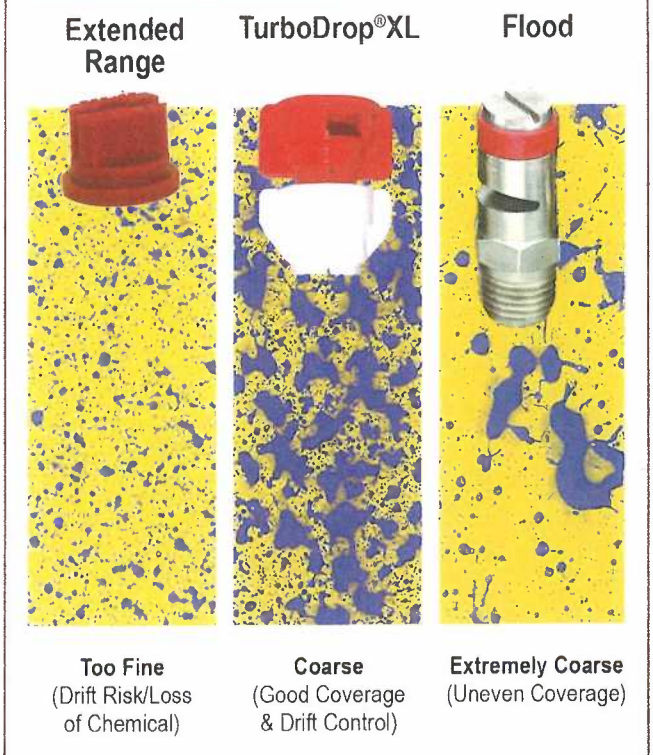
How TurboDrop® Works



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.

Spray Card Comparison of Common Turf Nozzles



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. The air inclusion is important in that 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.

"Double" Coverage

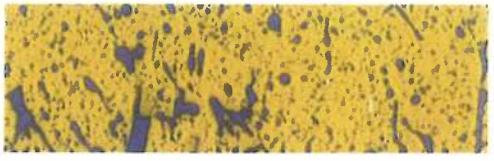
Greenleaf Technologies introduced the first air injected twin fan nozzles in 2005. These nozzles split the flow in half, directing it in two 110° fan patterns, targeting the leaf blade from two different angles. Rather than simply spraying straight down, the TurboDrop® TwinFan sprayed at a 30° forward angle and a 30° rearward angle, 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. Spraying with the TurboDrop® TwinFan was like spraying the turf twice in one pass.

The Asymmetric DualFan nozzle, introduced in 2011, is the next step in the evolution of the air injected twin fan. With this nozzle, the spray patterns are oriented 10° forward and 50° rearward, to allow for greater variations 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.

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.

Back Side Coverage of Turf Grass
(Spray cards mounted vertically.)

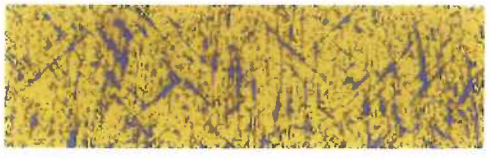


Flood Nozzle (front)



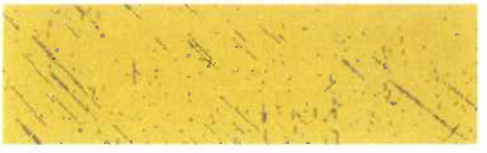


Flood Nozzle (back)

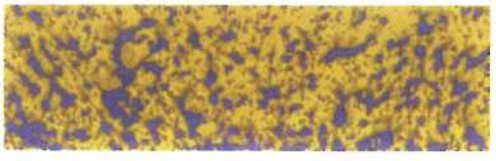


TurboDrop® TDXL (front)



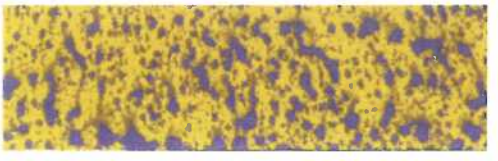


TurboDrop® TDXL (back)



TurboDrop® TDAD (front)





TurboDrop® TDAD (back)

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.

TURBO DROP®

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).

	Liquid Pressure PSI	TDXL DROPLET SIZE ASABE	TDAD DROPLET SIZE ASABE	Nozzle Capacity GPM	GALLONS PER THOUSAND SQ. FT. 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)	30	C	M	0.13	0.44	0.35	0.30	0.25	0.22	0.20	0.18	0.16	0.15
	40	C	M	0.15	0.51	0.41	0.34	0.29	0.26	0.23	0.20	0.19	0.17
	50	M	M	0.17	0.57	0.46	0.38	0.33	0.29	0.25	0.23	0.21	0.19
	60	M	M	0.18	0.63	0.50	0.42	0.36	0.31	0.28	0.25	0.23	0.21
	70	M	M	0.20	0.68	0.54	0.45	0.39	0.34	0.30	0.27	0.25	0.23
	80	M	F	0.21	0.72	0.58	0.48	0.41	0.36	0.32	0.29	0.26	0.24
	100	F	F	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)	30	C	C	0.17	0.59	0.47	0.39	0.34	0.30	0.26	0.24	0.21	0.20
	40	C	M	0.20	0.68	0.55	0.45	0.39	0.34	0.30	0.27	0.25	0.23
	50	M	M	0.22	0.76	0.61	0.51	0.44	0.38	0.34	0.30	0.28	0.25
	60	M	M	0.24	0.83	0.67	0.56	0.48	0.42	0.37	0.33	0.30	0.28
	70	M	M	0.26	0.90	0.72	0.60	0.52	0.45	0.40	0.36	0.33	0.30
	80	M	F	0.28	0.96	0.77	0.64	0.55	0.48	0.43	0.39	0.35	0.32
	100	F	F	0.32	1.08	0.86	0.72	0.62	0.54	0.48	0.43	0.39	0.36
TDXL110025* Standard TurboDrop (Use 50 mesh) **TDAD025*** DualFan TurboDrop (Use 100 mesh)	30	VC	C	0.22	0.74	0.59	0.49	0.42	0.37	0.33	0.30	0.27	0.25
	40	VC	C	0.25	0.85	0.68	0.57	0.49	0.43	0.38	0.34	0.31	0.28
	50	C	M	0.28	0.95	0.76	0.63	0.54	0.48	0.42	0.38	0.35	0.32
	60	M	M	0.31	1.04	0.83	0.70	0.60	0.52	0.46	0.42	0.38	0.35
	70	M	M	0.33	1.13	0.90	0.75	0.64	0.56	0.50	0.45	0.41	0.38
	80	M	M	0.35	1.20	0.96	0.80	0.69	0.60	0.54	0.48	0.44	0.40
	100	M	F	0.40	1.35	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)	30	XC	C	0.26	0.89	0.71	0.59	0.51	0.44	0.39	0.35	0.32	0.30
	40	VC	C	0.30	1.02	0.82	0.68	0.58	0.51	0.45	0.41	0.37	0.34
	50	C	M	0.34	1.14	0.91	0.76	0.65	0.57	0.51	0.46	0.42	0.38
	60	C	M	0.37	1.25	1.00	0.83	0.72	0.63	0.56	0.50	0.46	0.42
	70	M	M	0.40	1.35	1.08	0.90	0.77	0.68	0.60	0.54	0.49	0.45
	80	M	M	0.42	1.45	1.16	0.96	0.83	0.72	0.64	0.58	0.53	0.48
	100	M	F	0.47	1.62	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)	30	XC	C	0.35	1.18	0.94	0.79	0.67	0.59	0.52	0.47	0.43	0.39
	40	VC	C	0.40	1.36	1.09	0.91	0.78	0.68	0.61	0.55	0.50	0.45
	50	C	M	0.45	1.52	1.22	1.02	0.87	0.76	0.68	0.61	0.55	0.51
	60	C	M	0.49	1.67	1.34	1.11	0.95	0.83	0.74	0.67	0.61	0.56
	70	M	M	0.53	1.80	1.44	1.20	1.03	0.90	0.80	0.72	0.66	0.60
	80	M	M	0.57	1.93	1.54	1.28	1.10	0.96	0.86	0.77	0.70	0.64
	100	M	M	0.63	2.15	1.72	1.44	1.23	1.08	0.96	0.86	0.78	0.72
TDXL11005* Standard TurboDrop (Use 24 mesh) **TDAD05*** DualFan TurboDrop (Use 50 mesh)	30	XC	VC	0.43	1.48	1.18	0.98	0.84	0.74	0.66	0.59	0.54	0.49
	40	XC	C	0.50	1.71	1.36	1.14	0.97	0.85	0.76	0.68	0.62	0.57
	50	VC	C	0.56	1.91	1.53	1.27	1.09	0.95	0.85	0.76	0.69	0.64
	60	VC	M	0.61	2.09	1.67	1.39	1.19	1.04	0.93	0.84	0.76	0.70
	70	C	M	0.66	2.26	1.80	1.50	1.29	1.13	1.00	0.90	0.82	0.75
	80	C	M	0.71	2.41	1.93	1.61	1.38	1.21	1.07	0.96	0.88	0.80
	100	M	M	0.79	2.70	2.16	1.80	1.54	1.35	1.20	1.08	0.98	0.90
TDXL11006* Standard TurboDrop (Use 24 mesh) **TDAD06*** DualFan TurboDrop (Use 50 mesh)	30	XC	VC	0.52	1.77	1.42	1.18	1.01	0.89	0.79	0.71	0.64	0.59
	40	XC	VC	0.60	2.05	1.64	1.36	1.17	1.02	0.91	0.82	0.74	0.68
	50	XC	C	0.67	2.29	1.83	1.53	1.31	1.14	1.02	0.92	0.83	0.76
	60	VC	C	0.74	2.51	2.00	1.67	1.43	1.25	1.11	1.00	0.91	0.84
	70	VC	C	0.79	2.71	2.17	1.80	1.55	1.35	1.20	1.08	0.98	0.90
	80	C	M	0.85	2.89	2.31	1.93	1.65	1.45	1.29	1.16	1.05	0.96
	100	M	M	0.95	3.24	2.59	2.16	1.85	1.62	1.44	1.29	1.18	1.08
TDXL11008* Standard TurboDrop (Use 24 mesh) **TDAD08*** DualFan TurboDrop (Use 24 mesh)	30	XC	VC	0.69	2.35	1.88	1.57	1.34	1.18	1.05	0.94	0.86	0.78
	40	XC	VC	0.80	2.72	2.17	1.81	1.55	1.36	1.21	1.09	0.99	0.91
	50	XC	C	0.89	3.04	2.43	2.02	1.74	1.52	1.35	1.21	1.10	1.01
	60	XC	C	0.98	3.33	2.66	2.22	1.90	1.66	1.48	1.33	1.21	1.11
	70	VC	C	1.06	3.59	2.88	2.40	2.06	1.80	1.60	1.44	1.31	1.20
	80	VC	M	1.13	3.84	3.07	2.56	2.20	1.92	1.71	1.54	1.40	1.28
	100	C	M	1.26	4.30	3.44	2.86	2.45	2.15	1.91	1.72	1.56	1.43
TDXL11010* Standard TurboDrop (Use 24 mesh) **TDAD10*** DualFan TurboDrop (Use 24 mesh)	30	XC	XC	0.87	2.95	2.36	1.97	1.69	1.48	1.31	1.18	1.07	0.98
	40	XC	XC	1.00	3.41	2.73	2.27	1.95	1.70	1.51	1.36	1.24	1.14
	50	XC	VC	1.12	3.81	3.05	2.54	2.18	1.90	1.69	1.52	1.38	1.27
	60	XC	VC	1.22	4.17	3.34	2.78	2.38	2.09	1.85	1.67	1.52	1.39
	70	XC	C	1.32	4.51	3.61	3.00	2.58	2.25	2.00	1.80	1.64	1.50
	80	VC	C	1.41	4.82	3.85	3.21	2.75	2.41	2.14	1.93	1.75	1.61
	100	VC	M	1.58	5.39	4.31	3.59	3.08	2.69	2.39	2.15	1.96	1.80
TDXL11015* Standard TurboDrop (Use 24 mesh) **TDAD15*** DualFan TurboDrop (Use 24 mesh)	30	TBD	TBD	1.31	4.43	3.54	2.96	2.54	2.22	1.97	1.77	1.61	1.47
	40			1.50	5.12	4.10	3.41	2.93	2.55	2.27	2.04	1.86	1.71
	50			1.68	5.72	4.58	3.81	3.27	2.85	2.54	2.28	2.07	1.91
	60			1.83	6.26	5.01	4.17	3.57	3.14	2.78	2.51	2.28	2.09
	70			1.98	6.77	5.42	4.50	3.87	3.38	3.00	2.70	2.46	2.25
	80			2.12	7.23	5.78	4.82	4.13	3.62	3.21	2.90	2.63	2.42
	100			2.37	8.09	6.47	5.39	4.62	4.04	3.59	3.23	2.94	2.70

Optimal Pressure Range: Green-shaded area **Optimal Boom Height:** 18-20" for TDXL; 16-18" for TDAD (with 20" nozzle spacing)
Recommended Droplet Size: Medium (M) and Coarse (C) for 1GPT; Coarse (C) and Very Coarse (VC) for 2GPT

Asymmetric DualFan Nozzles for Colorants, Dyes and Pigments

65% 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 ryegrass 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 completely 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 DW16 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.

Quick Check Calibration Calculator



Quickly and easily measures the amount of liquid being dispersed through spray nozzles, and calculates application rates.

Can also be used to adjust nozzle flow rates, determine nozzle accuracy, and evaluate line pressure losses.

Our turf specific Quick Check Calibration Calculator uses per 1000ft^2 units measurements for your convenience.

Hand Held Weather Meters



Greenleaf Technologies offers six different hand held instruments to measure wind speed, temperature, wind chill, humidity, dew point, wind direction, altitude, barometric pressure, etc.

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

TURBO DROP®

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.

	Liquid Pressure PSI	DROPLET SIZE ASABE	Nozzle Capacity GPM	GALLONS PER THOUSAND SQ. FT. BASED ON 20" NOZZLE SPACING						
				2 MPH	3 MPH	4 MPH	5 MPH	6 MPH	7 MPH	8 MPH
TDAD04 DualFan TurboDrop (Use 50 mesh) **TDCAD04** (ceramic orifice) 	30	C	0.35	1.18	0.79	0.59	0.47	0.39	0.34	0.30
	40	C	0.40	1.36	0.91	0.68	0.55	0.45	0.39	0.34
	50	M	0.45	1.52	1.02	0.76	0.61	0.51	0.44	0.38
	60	M	0.49	1.67	1.11	0.83	0.67	0.56	0.48	0.42
	70	M	0.53	1.80	1.20	0.90	0.72	0.60	0.52	0.45
	80	M	0.57	1.93	1.28	0.96	0.77	0.64	0.55	0.48
	100	M	0.63	2.15	1.44	1.08	0.86	0.72	0.62	0.54
TDAD05 DualFan TurboDrop (Use 50 mesh) **TDCAD05** (ceramic orifice) 	30	VC	0.43	1.48	0.98	0.74	0.59	0.49	0.42	0.37
	40	C	0.50	1.71	1.14	0.86	0.68	0.57	0.49	0.43
	50	C	0.56	1.91	1.27	0.95	0.76	0.64	0.54	0.48
	60	M	0.61	2.09	1.39	1.04	0.84	0.70	0.60	0.52
	70	M	0.66	2.26	1.50	1.13	0.90	0.75	0.64	0.56
	80	M	0.71	2.41	1.61	1.21	0.96	0.80	0.69	0.60
	100	M	0.79	2.70	1.80	1.35	1.08	0.90	0.77	0.67
TDAD06 DualFan TurboDrop (Use 50 mesh) **TDCAD06** (ceramic orifice) 	30	VC	0.52	1.77	1.18	0.89	0.71	0.59	0.51	0.44
	40	VC	0.60	2.05	1.36	1.02	0.82	0.68	0.58	0.51
	50	C	0.67	2.29	1.53	1.14	0.92	0.76	0.65	0.57
	60	C	0.74	2.51	1.67	1.25	1.00	0.84	0.72	0.63
	70	C	0.79	2.71	1.80	1.35	1.08	0.90	0.77	0.68
	80	M	0.85	2.89	1.93	1.45	1.16	0.96	0.83	0.72
	100	M	0.95	3.24	2.16	1.62	1.29	1.08	0.92	0.81
TDAD08 DualFan TurboDroo (Use 24 mesh) **TDCAD08** (ceramic orifice) 	30	VC	0.69	2.35	1.57	1.18	0.94	0.78	0.67	0.59
	40	VC	0.80	2.72	1.81	1.36	1.09	0.91	0.78	0.68
	50	C	0.89	3.04	2.02	1.52	1.21	1.01	0.87	0.76
	60	C	0.98	3.33	2.22	1.66	1.33	1.11	0.95	0.83
	70	C	1.05	3.59	2.40	1.80	1.44	1.20	1.03	0.90
	80	M	1.13	3.84	2.56	1.92	1.54	1.28	1.10	0.96
	100	M	1.26	4.30	2.86	2.15	1.72	1.43	1.23	1.07
TDAD10 DualFan TurboDrop (Use 24 mesh) **TDCAD10** (ceramic orifice) 	30	XC	0.87	2.95	1.97	1.48	1.18	0.98	0.84	0.74
	40	XC	1.00	3.41	2.27	1.70	1.36	1.14	0.97	0.89
	50	VC	1.12	3.81	2.54	1.90	1.52	1.27	1.09	0.95
	60	VC	1.22	4.17	2.78	2.09	1.67	1.39	1.19	1.04
	70	C	1.32	4.51	3.00	2.25	1.80	1.50	1.29	1.13
	80	C	1.41	4.82	3.21	2.41	1.93	1.61	1.38	1.20
	100	M	1.58	5.39	3.59	2.69	2.15	1.80	1.54	1.35
AMDF12 (all polyacetal) AM11006 & AM11006 (Use 50 mesh) 	20	XC	0.85	2.90	1.93	1.45	1.16	0.97	0.83	0.72
	30	VC	1.04	3.55	2.37	1.77	1.42	1.18	1.01	0.89
	40	C	1.20	4.10	2.73	2.05	1.64	1.37	1.17	1.02
	50	C	1.34	4.58	3.05	2.29	1.83	1.53	1.31	1.15
	60	C	1.47	5.02	3.34	2.51	2.01	1.67	1.43	1.25
	70	M	1.59	5.42	3.61	2.71	2.17	1.81	1.55	1.35
	80	M	1.70	5.79	3.86	2.90	2.32	1.93	1.66	1.45
DW14 (all polyacetal) SMP11008 & SMP11006 (Use 50 mesh) 	20	M	0.99	3.35	2.57	1.69	1.35	1.13	0.96	0.84
	30	M F	1.21	4.13	2.76	2.07	1.65	1.36	1.18	1.03
	40	F	1.40	4.77	3.18	2.39	1.91	1.59	1.36	1.19
	50	F	1.57	5.34	3.56	2.67	2.13	1.78	1.52	1.33
	60	F	1.71	5.85	3.96	2.92	2.34	1.95	1.67	1.46
DW16 (all polyacetal) SMP11008 & SMP11008 (Use 50 mesh) 	20	C	1.13	3.86	2.57	1.93	1.54	1.29	1.10	0.96
	30	M	1.39	4.72	3.15	2.36	1.89	1.57	1.35	1.18
	40	F	1.60	5.45	3.64	2.73	2.18	1.82	1.56	1.36
	50	F	1.79	6.10	4.07	3.05	2.44	2.03	1.74	1.52
	60	F	1.96	6.68	4.45	3.34	2.67	2.23	1.91	1.67
DW18 (all polyacetal) SMP11010 & SMP11008 (Use 50 mesh) 	20	C M	1.27	4.34	2.89	2.17	1.74	1.45	1.24	1.08
	30	M	1.56	5.31	3.54	2.66	2.13	1.77	1.52	1.33
	40	M F	1.80	6.14	4.09	3.07	2.45	2.05	1.75	1.53
	50	M F	2.01	6.86	4.57	3.43	2.74	2.29	1.96	1.72
	60	M F	2.20	7.52	5.01	3.76	3.01	2.51	2.15	1.88
DW20 (all polyacetal) SMP11010 & SMP11010 (Use 50 mesh) 	20	C	1.41	4.82	3.21	2.41	1.93	1.61	1.38	1.20
	30	M	1.73	5.90	3.93	2.95	2.36	1.97	1.69	1.46
	40	M	2.00	6.81	4.54	3.41	2.73	2.27	1.95	1.70
	50	M	2.23	7.62	5.08	3.81	3.05	2.54	2.18	1.90
	60	M	2.45	8.34	5.56	4.17	3.34	2.78	2.38	2.09

Optimal Pressure Range: Green Shaded Area
Recommended Boom Height: 12-22" (with 20" nozzle spacing)
Optimal Boom Height: 16-18"
To convert from GPT to GPA, multiply GPT by 43.7.

Boomless Nozzles





Stainless Steel Construction

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 provide by the Venturi reduces off target movement and improves the uniformity of distribution, compared to conventional nozzles.

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

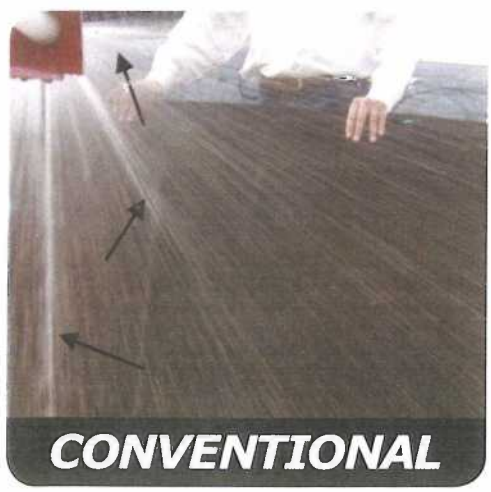
Boom85TD Application Rate: GPA @ 42" height (16' swath)

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

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.	66.6	44.4	33.3	26.7	22.2	19.0	16.7	14.8	12.1	11.1	10.3	9.5	8.9
40 psi	4.0 gpm	13 ft.	76.2	50.8	38.1	30.5	25.4	21.8	19.0	16.9	13.8	12.7	11.7	10.9	10.2
50 psi*	4.5 gpm	13 ft.	85.7	57.1	42.8	34.3	28.6	24.5	21.4	19.0	15.6	14.3	13.2	12.2	11.4
60 psi*	5.0 gpm	13 ft.	95.2	63.5	47.6	38.1	31.7	27.2	23.8	21.2	17.3	15.9	14.6	13.6	12.7

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





Download TurfCalc Nozzle Calculator app for your phone!



Available on the App Store

Google play

Green denotes DualFan users

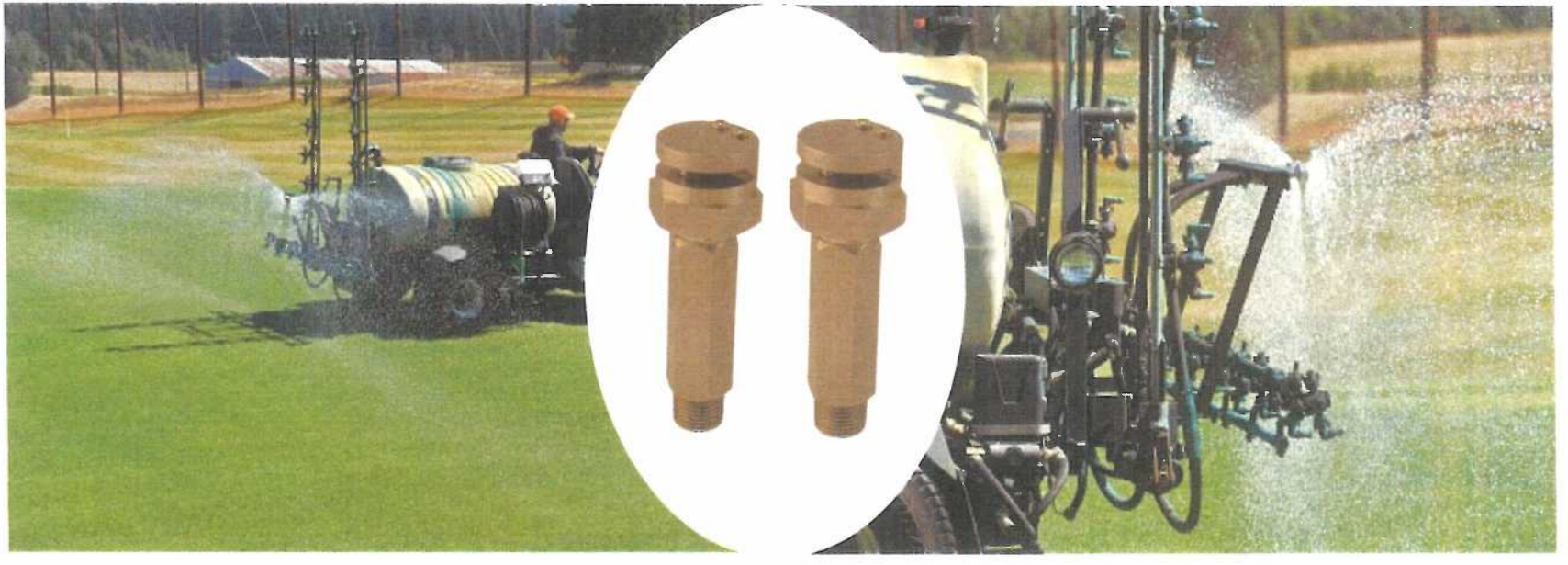
TurboDrop® Testimonials

Golf Course	Nozzle / PSI / rate	Chemicals	Comments
Ballentrae Golf Club Gary T. Bush Pelham AL	**TDAD04** 60 psi 1.1 gpt	All Pesticides and Nutrients. Growth Regulators.	**After spraying a green, there is no striping - it simply looks like the green has been air brushed!**
Country Club of Little Rock Chuck Gast Little Rock AR	**TDXL11004** 43 psi 2.0 gpt Greens	Fungicides, Growth Regulators, Fertilizers	**Larger droplets & less drift.**
Turkey Mountain GC Terry Smith Horseshoe Bend AR	**TDXL11005** 20-40 psi 1.07 gpt Greens 55&65 gpa Fairway	Fungicides, Herbicides, Insecticides	**Able to use in breezy conditions. Larger window of application.**
Cotton Ranch Club Craig Cahalane Gypsum CO	**TDXL11008** 48 psi 75 gpa Greens 75 gpa Fairways	Fungicides, Herbicides, Insecticides	**Better spray pattern, better in breezy conditions. Much better on drift reduction.**
Tumble Brook CC Cindy Johnson Bloomfield CT	**TDCXL/TDAD: 06 & 10** 35-40 psi 2 gpt Greens 1 gpt Fairways	All Chemicals	**Less drift, better uniform distribution. Drift is reduced. Nozzle plugging is reduced. Best spray nozzle ever used!!!**
Norwich GC Bruce Morse Norwich CT	**TDXL11008 & TDXL11010** 40 psi 85 gpa Greens 50 gpa Fairways		**No drift at any pressure. Great nozzles! Still the best product out there!**
Countryside Country Club Chris Senior Clearwater FL	**TDAD08** 4.5-6.0 mph 43.5 gpa	Herbicides, Insecticides, Nematode Treatments, Foliar Application, Primo	**I have reduced my Primo applications… due to the fact that I am getting much improved coverage on the plant.**
Bradenton Country Club Renze Berg Bradenton FL	**TDAD05** 40 psi 1.36 gpt	Fertilizers, Herbicides, Pesticides, Fungicides	**Since I have switched to TurboDrop, I get more out of applications and I feel confident my efficacy has improved dramatically.**
Grand Harbor Golf & Tennis Justin Allison Vero Beach FL	**TDAD06** 35-40 psi 1.1 - 1.6 gpt	Merit, Talstar, Aloft, Fusilade, Roundup	**Excellent coverage compared to conventional nozzles. No streaks!**
Horseshoe Bend Country Club Sam Welch Roswell GA	**TDAD03** 40 psi .69 gpt	Legacy	**Streaking issue was completely solved by switching to the TDAD03.**
Idaho Falls Country Club Josh Benson Idaho Falls ID	**TDAD04 & TDAD06 & TDAD08** 40 psi .91 - 2.02 gpt	Primo & Foliar Fertilizers, 2, 4-D, Fungicides, Wetting Agents	**Will never go back to any other nozzle.**
The Oaks Golf Course Travis Williams Springfield IL	**TDXL11008** 40 psi 1.5 gpt Greens 1.3 gpt Fairways	Fungicides, Herbicides	**Good drift control and uniform spray pattern.**
Twin Orchard Country Club Kyle Jacobsen Long Grove IL	**TDAD08** 30-60 psi 78 gpa / 1.79 gpt	All	**Can continue spraying in a slight wind with better coverage.**
Lincolnshire Country Club Erik Swenson Crete IL	**TDXL11008** 30 psi 50 gpa	All Chemicals	**I use them for any chemical, fertilizer, etc. and I get good coverage without worrying about wind and drift.**
Victoria National GC Dale Minick Newburgh IN	**TDXL11006 & TDCXL11006** 55 psi 1.42 gpt Greens .8 gpt Fairways	Daconil, Banol, Bayleton, Compass	**Do well on drift reduction, uniformity, droplet sizing.**
New Orleans Country Club Neil Mayberry New Orleans LA	**TDAD06** 52 psi	Soluble Fertilizers, Fungicides, Growth Regulators	**This is the best nozzle on the market. Have also used TDXL11006.**
Squire Creek Country Club Chris Stout Choudrant LA	**TDXL11006** 35 psi 2 gpt Greens Varies on Fairways	Fungicides, Fertilizers, Growth Regulators, Insecticides	**Less likely to clog and they perform better in windy conditions.**
The International Ted Zubiel Bolton MA	**TDXL11008 & TDXL11010** 40-50 psi 1.5 gpt Greens 1.5 gpt Fairways	Fungicides, Insecticides, Liquid Fertilizer	**Excellent spray pattern and coverage. Better distribution of smaller droplets.**
Stow Acres Country Club Jason VanBuskirk Stow MA	**TDAD08** 60 psi 3.9 mph	Fungicides, Insecticides, Herbicides	**Great company and great product!**
Chesapeake Bay Golf Club Thomas Brown Rising Sun MD	**TDXL11008** 40 psi 1.81 gpt Greens 1.36 gpt Fairways	All Chemicals	**We were able to spray without drift for the first time in my 23 years of experience.**
Sandy Ridge Golf Course Michael Bergelin Midland MI	**TDXL11010** 30-40 psi 2.3 gpt Greens 1.15 gpt Fairways	Fungicides, Herbicides, Insecticides, Fertilizers, Wetting Agents	**I have worked at 3 different golf courses, and at each one, I have requested TurboDrop. I tell all my Supt. friends to try the nozzles.**
The Wilderness @ Fortune Bay Vincent Dodge Tower MN	**TDAD06** 60 psi 1.8 - 2.0 gpt	Contact Fungicides	**Great coverage. Great performance in calm conditions.**
Dellwood Hills Golf Club Eric Peterson Dellwood MN	**TDXL11010 & TDAD10** 34-48 psi	Primo, Cutless, Phosphite, Chlorothalonil, MKP, Propaconizol, PCNB	**Using TurboDrop flat fan nozzles over our former Raindrop nozzles, we have reduced drift.**

Cannon Golf Club Jeff Backstrom Cannon Falls MN	**TDXL11008 & TDXL11006** .8 gpt Greens	Fertilizer	**Better coverage than TeeJet.**
Greenville Country Club Derek Whitlow Greenville NC	**TDXL11010** 50 psi 1.69 gpt Greens	Fungicides, Growth Regulators, Herbicides, Water Soluble Fertilizers, etc.	**Considerable drift reduction. Better penetration than Raindrop nozzles. Pattern was better.**
Lochmere Golf Club Gene Crews Cary NC	**TDXL11004** 60 psi 1.9 gpt Greens 26 gpa Fairways	Herbicides	**Less drift with TurboDrop nozzles.**
Tobacco Road Golf Club Perry Payne Sanford NC	**TDXL11006 & TDXL11010** 40 psi 2 gpt Greens 1 gpt Fairways	Fertilizer, Fungicide, Herbicide	**Coverage was better with TurboDrop. Excellent pattern, less drift, non clogging, good wear.**
Oyster Bay Golf Links Dave McGhee Sunset Beach NC	**TDAD04** 40 psi 25-45 gpt	Fertilizer, PGRs, Herbicides	**Better and more uniform coverage.**
Twin Lakes Golf Course William Wilkins Chapel Hill NC	**TDAD04 & TDAD08** 40-60 psi .75 - 1.8 gpt	Fungicides, Herbicides	**The best!**
Kinston Country Club Dean Baker Kinston NC	**TDXL11004** 40 psi .8 & 2.0 gpt Greens	All Chemicals	**No drift. Better coverage. No lines like the other nozzles.**
Beau Rivage Golf & Resort Jay Harrison Wilmington NC	**TDAD08** 40 psi 1.6 gpt	Foliar Fertilizers + Primo	**Coverage and uniformity.**
Platteview Country Club Jason Allen Bellevue NE	**TDXL11004 & TDXL11008** 25-30 psi	All Chemicals	**We had much better coverage and seemed to have more efficient sprays.**
The Seawane Club Brian Benedict Hewlett Harbor NY	**TDXL11010 & TDTW10** 40 psi 3 gpt Greens 1.8 gpt Fairways	All Chemicals	**No drift and we are right on the ocean with excessive daily wind. Much better than the XR TeeJet that I have used for years.**
Westbrook Country Club Eric Howarth Mansfield OH	**TDAD08** 55 psi 1.1 gpt	Chlorothalonil/Propaconazole Trinipac-ethyl/Paclobutrazole	**These nozzles literally paint both sides of the leaf blades for great coverage with very little drift.**
Squaw Creek Country Club Bob Patrick Vienna OH	**TDXL11008 & TDXL11010** 30 psi 8.6 gpt Greens 17.4 gpt Fairways	All Applications	**Just an all around good nozzle. We've used these nozzles on everything from WSP's to liquid fertilizer. VERY PLEASED.**
Heritage Hills Golf Course Jacob Gordon Claremore OK	**TDAD05** 60 psi .92 - 1.5 gpt	Contact, Systemic	**Uniform coverage and drift control.**
The Canyons @ Blackjack Ridge Ben Martin Sand Springs OK	**TDAD05 & TDAD08** 45 psi 1 - 1.9 gpt	All Applications	**Unless a better product comes out (like a nozzle with NO drift), I will not be using anything else.**
Horsham Valley Golf Club David Koch Ambler PA	**TDXL11010** 40 psi 3.7 gpt greens 1.7 gpt Fairways	Fungicides, Herbicides, Insecticides	**Was able to spray in windier conditions. Far less clogging of nozzles. Better penetration.**
Manufacturers Golf Club Scott May Ft. Washington PA	**TDAD08** 35 psi 50 gpa	Turfscreen, Chlorothacom L, Primo, Heritage, Dall's, Foliar Nutrients	**Much better drift control and leaf surface coverage.**
Sakonnet Golf Cub Kirk Whiting Little Compton RI	**TDCXL11008** 35-85 psi .8 - 2 gpt	Signature, Endorse, Bonner, Emerald	**Best nozzle I've ever used! 9 year user.**
Colonial Country Club Derek Oglesby Cordova TN	**TDCXL11003** 20-30 psi 12 -60 gpa Roughs	Roundup, Herbicides	**Low drift. Good spray pattern.**
Birch Creek Golf Course Chad Daniels Smithfield UT	**TDCXL11010** 30-60 psi 2.5 gpt Greens 2.0 gpt Fairways	All Chemicals	**Better coverage and penetration than Raindrop. The durability of the nozzles is very good.**
Herndon Golf Club Mike Mueller Herndon VA	**TDXL11008 & TDAD08** 50 psi 1 & 2 Gal/1000 ft^2	All Chemicals	**My disease/insect/weed problems have gone away!**
Brattleboro Country Club Bob Walker Brattleboro VT	**TDXL11008 & TDXL11010** 50 psi 1.74 gpt Greens 1.52 gpt Fairways	Contact – Systemic Fungicides – Herbicides, Insecticides	**This is a new S40K sprayer. The stock Toro nozzles are junk. Good drift reduction, better coverage, no plugging problems.**
Kwiniaska Golf Club Jim Gernander Shelburne VT	**TDXL11008** 50 psi 2 gpt	Headway, Daconil	**These are great nozzles. They allow me to use a finer particle spray to increase coverage while also reducing drift potential.**
Prairie du Chien Country Club Cameron White Prairie due Chien WI	**TDAD08** 40 psi 1.81 gpt	Fungicides, Insecticides, Herbicides	**Better crown penetration.**

Boomless Nozzles for Turf Fairways and Rough

The Boom __TD is a pair of air injected boomless nozzles designed to increase efficiency when spraying fertilizer on fairways or in the rough. A stainless steel TurboDrop injector (Boom __ INJ) is combined with a stainless steel boomless nozzle to generate a more uniform and drift resistant spray pattern than is possible with a boomless nozzle alone.



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

	Pressure	Flow	Swath Width per Nozzle	Speed (mph)													
				2	3	4	5	6	7	8	9	10	11	12	13	14	15
Boom 40TD	30 psi	3.5 gpm	13 ft.	66.6	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.	76.2	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.	85.7	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.	95.2	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

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

	Pressure	Flow	Swath Width per Nozzle	Speed (mph)													
				2	3	4	5	6	7	8	9	10	11	12	13	14	15
Boom 85TD	30 psi	7.5 gpm	16 ft.	116.0	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.	131.5	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.	147.0	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.	160.9	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

Mount nozzles 6-7" apart at 36-48" height, with enough overlap between the nozzles to prevent streaking. Spray swath may change with changes in pressure.

Boomless Nozzle Comparison: Conventional vs Air Injected



Heavy streak going straight down



Conventional vs Air Injected (Boom 85TD)



Notice the heavy streaks on the outside and in the center of the pattern = streaky pattern.



Notice the uniformity across the pattern. The droplet size is also more uniform and more drift resistant.