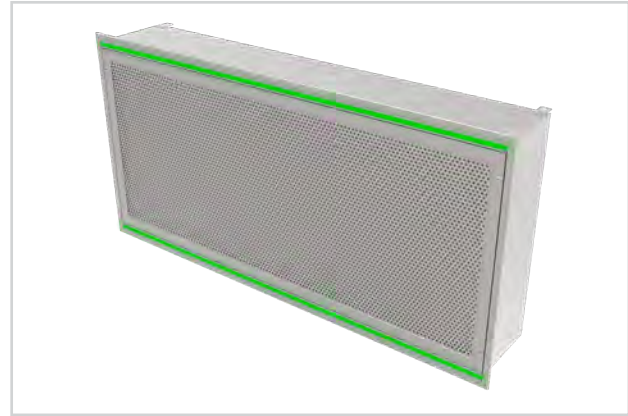


TLFR-LED

- Ideal for installation in hospital operating rooms
- Integral LED luminaire with tunable color temperature @ 90 CRI
- Snap-in, tool-less HEPA filter installation and removal
- Factory pressure tested
- Roomside accessible control enclosure
- Roomside accessible PAO challenge port option
- Perforated face quickly removes by loosening quarter-turn fasteners
- Three free area options
- Accommodates filters with 2", 3", & 4" media packs
- Compatible with 1" or 1½" T-bar ceiling grids



TLFR-LED



hospitals

surgical

cleanrooms

research labs



See website for Specifications

MODELS:

TLFR-AA-LED / Aluminum
TLFR-LED / 304 Stainless Steel

FINISHES:

Standard Finish - #26 White
Optional Finish - #04 Mill

OVERVIEW

Vertical Laminar Flow Technology

The next generation Titus unidirectional flow diffuser for critical environments has been designed to comply with industry standard, ASHRAE 170, offering important safeguards for surgical patients. Used in operating rooms as the primary diffusers, the vertical piston of air created by the TLFR-LED is used to discharge clean air over the patient during operations. The integration of high-output, high-efficiency LED lighting eliminates the need for specialized luminaires around the perimeter of the diffuser array. The integrated LED lighting improves lighting quality over the operating table or workspace with more direct lighting and less shadows. Eliminating the need for the perimeter lighting reduces installed components, enabling more flexibility for placement of diffusers and ceiling mounted equipment. Including snap-in, auto-centering filter retainers, the new TLFR-LED reduces the amount of time and effort during installation and removal of filters. This decreases the time a lab or operating suite is out of commission, allowing facilities to maximize profitability and patient care.

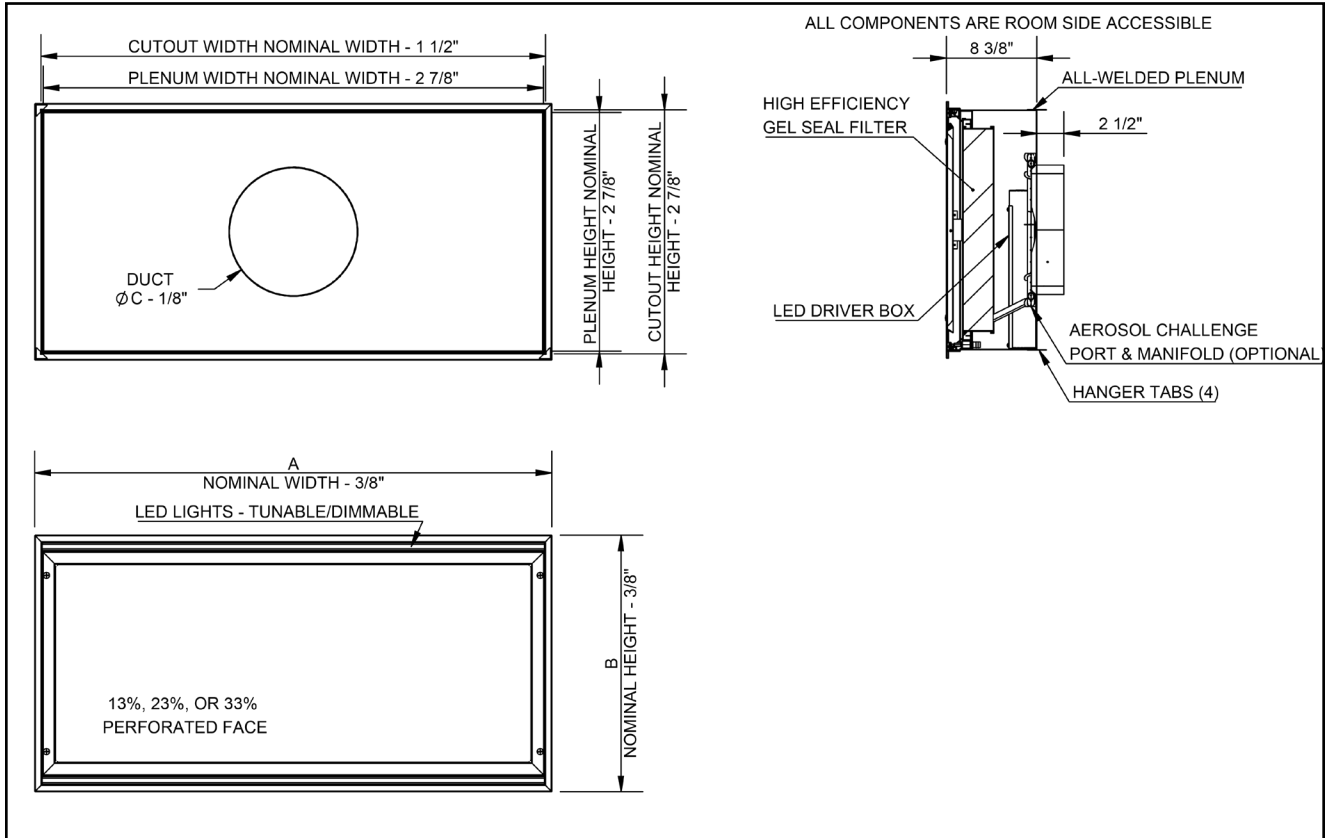
Unidirectional flow minimizes air induction, reducing the opportunity for contaminated air to be re-entrained and pollute a clean airstream.

The TLFR-LED Series of laminar flow diffusers generates a low velocity, evenly distributed, downward moving "piston" of conditioned air.

Installed over the operating table in a hospital operating room, TLFR-LED diffusers help protect the patient from contaminated room secondary air. The only appreciable amount of room air entrainment occurs at the boundaries of the moving air mass, outside the confines of the operating table. As a result, the patient is effectively isolated from residual room air.

TLFR-LED is especially effective in cooling areas with heavy, localized, internal loads, as in computer rooms. The column of air delivered by the TLFR-LED cools the load source directly without generating high velocities in the occupied space.

TLFR-LED UNIT DIMENSIONS

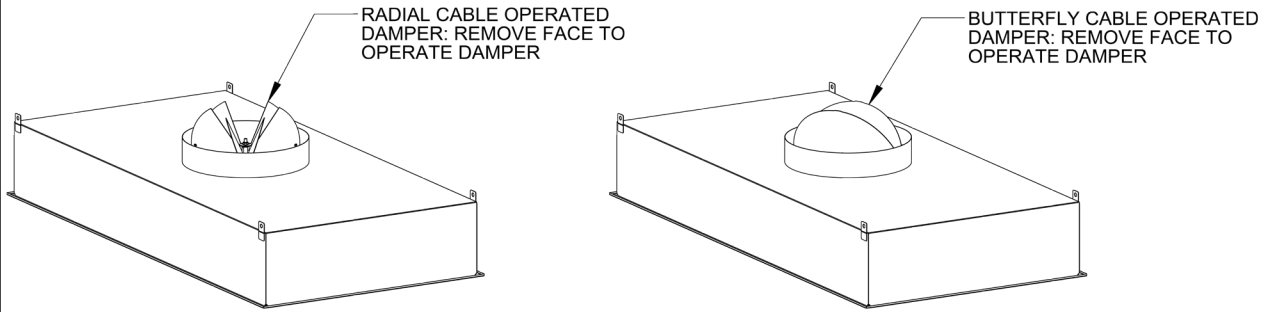


Module Size	A	B
24 x 12	23 ⁵ / ₈ "	11 ⁵ / ₈ "
24 x 24	23 ⁵ / ₈ "	23 ⁵ / ₈ "
36 x 12	35 ⁵ / ₈ "	11 ⁵ / ₈ "
48 x 12	47 ⁵ / ₈ "	11 ⁵ / ₈ "
48 x 24	47 ⁵ / ₈ "	23 ⁵ / ₈ "
60 x 12	59 ⁵ / ₈ "	11 ⁵ / ₈ "
60 x 24	59 ⁵ / ₈ "	23 ⁵ / ₈ "

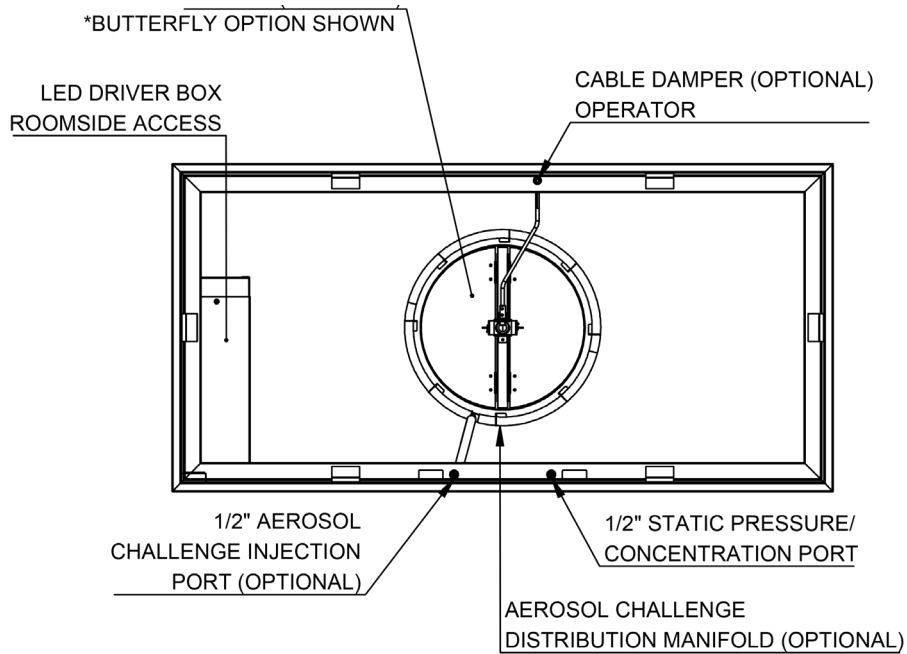
Nominal Inlet Size	C
6	5 ⁷ / ₈ "
8	7 ⁷ / ₈ "
10	9 ⁷ / ₈ "
12	11 ⁷ / ₈ "

OPTIONAL ACCESSORIES

Cable Operated Damper Detail



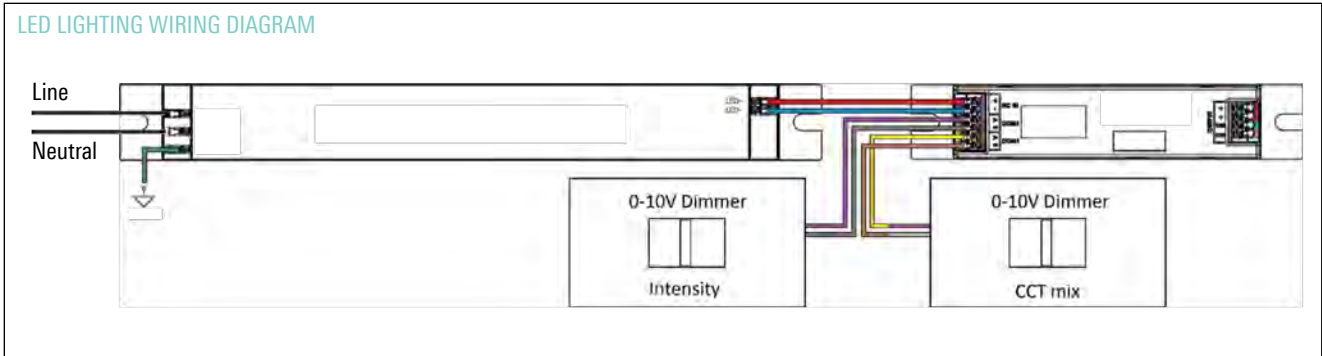
Control Enclosure & Accessory Detail



FACE FRAME AND FILTER REMOVED FOR CLARITY

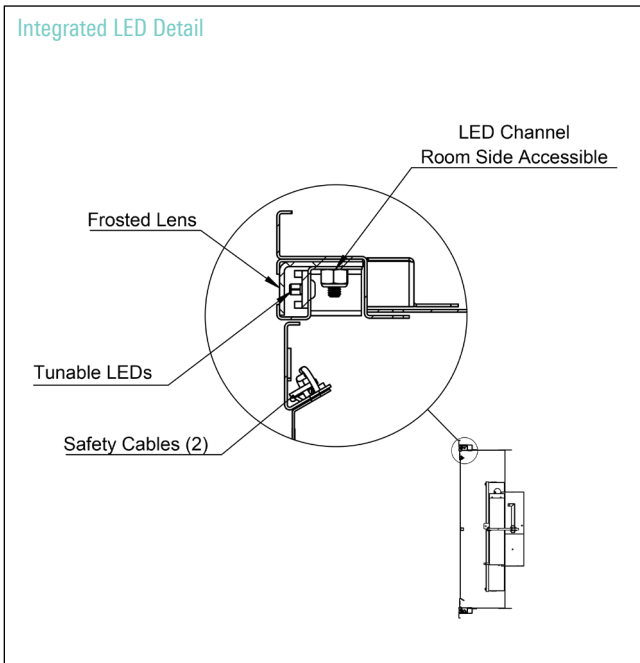
UNIT WIRING

LED LIGHTING WIRING DIAGRAM

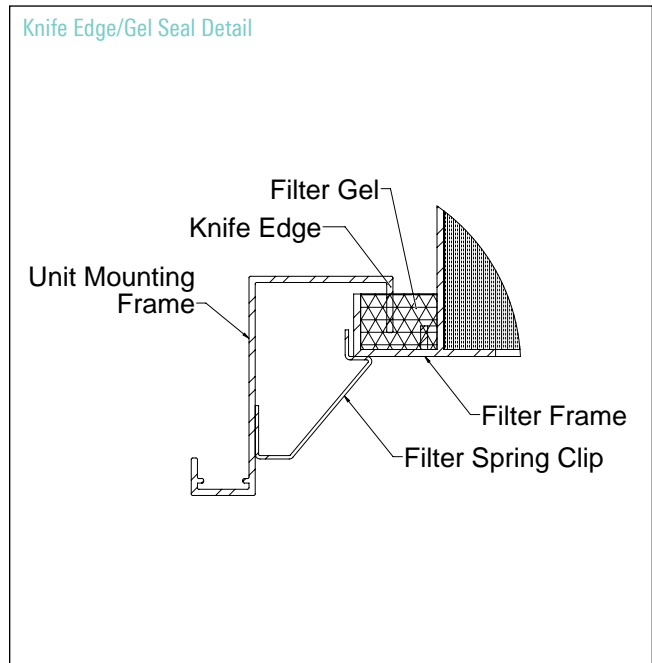


Note: Dimmers to be provided by others. Tunable White and Tunable Green to White configurations require dimmers for both intensity and color temperature.

Integrated LED Detail



Knife Edge/Gel Seal Detail



TLFR-AA-LED / TLFR-SS-LED WITH 13% PERFORATED FACE - 2" FILTER

6" Round Inlet	Airflow (CFM)	100	120	140	160	180	220	240	260	300
48" x 12" Module	Total Pressure	0.306	0.376	0.448	0.524	0.602	0.767	0.854	0.944	1.132
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41
24" x 24" Module	Total Pressure	0.243	0.299	0.359	0.421	0.487	0.625	0.698	0.775	0.936
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41
24" x 48" Module	Total Pressure	0.117	0.147	0.180	0.215	0.251	0.333	0.377	0.423	0.522
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41

8" Round Inlet	Airflow (CFM)	100	120	140	160	180	220	240	260	300
60" x 12" Module	Total Pressure	0.224	0.272	0.321	0.372	0.423	0.529	0.584	0.640	0.755
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
48" x 24" Module	Total Pressure	0.099	0.121	0.144	0.168	0.192	0.244	0.271	0.298	0.357
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
24" x 60" Module	Total Pressure	0.078	0.097	0.114	0.134	0.154	0.197	0.219	0.243	0.292
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21

10" Round Inlet	Airflow (CFM)	215	240	265	295	320	345	400	425	515
48" x 24" Module	Total Pressure	0.214	0.243	0.271	0.306	0.336	0.368	0.437	0.470	0.593
	NC (Noise Criteria)	-	-	-	-	-	-	-	21	28
60" x 24" Module	Total Pressure	0.169	0.191	0.214	0.242	0.266	0.292	0.347	0.374	0.474
	NC (Noise Criteria)	-	-	-	-	-	-	-	21	28

12" Round Inlet	Airflow (CFM)	215	240	265	295	320	345	400	425	515
48" x 24" Module	Total Pressure	0.206	0.233	0.259	0.291	0.318	0.347	0.409	0.438	0.547
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
60" x 24" Module	Total Pressure	0.161	0.181	0.201	0.227	0.248	0.271	0.319	0.343	0.428
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21

PERFORMANCE NOTES

- Performance data includes initial resistance of optional HEPA-R Filter with 2" thick filter media
- Data obtained in accordance with ASHRAE Standard 70-2006
- NC Values are based on a room absorption of 10 dB
- NC levels less than 15 dB are shown as "-"
- All pressures are in inches of water

TLFR-AA-LED / TLFR-SS-LED WITH 23% PERFORATED FACE - 2" FILTER

6" Round Inlet	Airflow (CFM)	100	120	140	160	180	220	240	260	300
48" x 12" Module	Total Pressure	0.301	0.368	0.438	0.510	0.585	0.742	0.824	0.909	1.086
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41
24" x 24" Module	Total Pressure	0.238	0.292	0.350	0.409	0.472	0.603	0.672	0.744	0.895
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41
24" x 48" Module	Total Pressure	0.116	0.146	0.178	0.212	0.248	0.328	0.371	0.416	0.513
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41

8" Round Inlet	Airflow (CFM)	100	120	140	160	180	220	240	260	300
60" x 12" Module	Total Pressure	0.221	0.267	0.315	0.363	0.413	0.513	0.565	0.618	0.726
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
48" x 24" Module	Total Pressure	0.098	0.119	0.142	0.165	0.188	0.239	0.265	0.291	0.347
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
24" x 60" Module	Total Pressure	0.078	0.096	0.113	0.132	0.152	0.193	0.215	0.238	0.286
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21

10" Round Inlet	Airflow (CFM)	215	240	265	295	320	345	400	425	515
48" x 24" Module	Total Pressure	0.209	0.237	0.264	0.297	0.325	0.355	0.420	0.451	0.566
	NC (Noise Criteria)	-	-	-	-	-	-	-	21	28
60" x 24" Module	Total Pressure	0.166	0.187	0.209	0.236	0.259	0.284	0.336	0.362	0.457
	NC (Noise Criteria)	-	-	-	-	-	-	-	21	28

12" Round Inlet	Airflow (CFM)	215	240	265	295	320	345	400	425	515
48" x 24" Module	Total Pressure	0.201	0.227	0.252	0.282	0.307	0.334	0.392	0.419	0.519
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
60" x 24" Module	Total Pressure	0.158	0.177	0.197	0.221	0.241	0.263	0.309	0.331	0.411
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21

PERFORMANCE NOTES

- Performance data includes initial resistance of optional HEPA-R Filter with 2" thick filter media
- Data obtained in accordance with ASHRAE Standard 70-2006
- NC Values are based on a room absorption of 10 dB
- NC levels less than 15 dB are shown as "-"
- All pressures are in inches of water

TLFR-AA-LED / TLFR-SS-LED WITH 33% PERFORATED FACE - 2" FILTER

6" Round Inlet	Airflow (CFM)	100	120	140	160	180	220	240	260	300
48" x 12" Module	Total Pressure	0.299	0.366	0.436	0.507	0.581	0.736	0.817	0.900	1.074
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41
24" x 24" Module	Total Pressure	0.237	0.291	0.348	0.406	0.468	0.598	0.665	0.736	0.885
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41
24" x 48" Module	Total Pressure	0.116	0.145	0.177	0.212	0.247	0.327	0.370	0.414	0.511
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41

8" Round Inlet	Airflow (CFM)	100	120	140	160	180	220	240	260	300
60" x 12" Module	Total Pressure	0.220	0.266	0.314	0.361	0.410	0.509	0.560	0.612	0.719
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
48" x 24" Module	Total Pressure	0.098	0.119	0.141	0.165	0.188	0.238	0.264	0.289	0.345
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
24" x 60" Module	Total Pressure	0.078	0.095	0.113	0.132	0.152	0.193	0.215	0.237	0.284
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21

10" Round Inlet	Airflow (CFM)	215	240	265	295	320	345	400	425	515
48" x 24" Module	Total Pressure	0.208	0.235	0.262	0.295	0.323	0.352	0.416	0.446	0.559
	NC (Noise Criteria)	-	-	-	-	-	-	-	21	28
60" x 24" Module	Total Pressure	0.165	0.186	0.208	0.235	0.258	0.282	0.334	0.359	0.453
	NC (Noise Criteria)	-	-	-	-	-	-	-	21	28

12" Round Inlet	Airflow (CFM)	215	240	265	295	320	345	400	425	515
48" x 24" Module	Total Pressure	0.200	0.225	0.250	0.280	0.305	0.331	0.388	0.415	0.513
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
60" x 24" Module	Total Pressure	0.157	0.176	0.196	0.220	0.240	0.261	0.306	0.328	0.406
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21

PERFORMANCE NOTES

- Performance data includes initial resistance of optional HEPA-R Filter with 2" thick filter media
- Data obtained in accordance with ASHRAE Standard 70-2006
- NC Values are based on a room absorption of 10 dB
- NC levels less than 15 dB are shown as "-"
- All pressures are in inches of water

TLFR-AA-LED / TLFR-SS-LED WITH 13% PERFORATED FACE

6" Round Inlet	Airflow (CFM)	100	120	140	160	180	220	240	260	300
48" x 12" Module	Total Pressure	0.036	0.052	0.070	0.092	0.116	0.173	0.206	0.242	0.322
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41
24" x 24" Module	Total Pressure	0.035	0.050	0.068	0.089	0.113	0.168	0.200	0.235	0.313
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41
24" x 48" Module	Total Pressure	0.028	0.041	0.056	0.073	0.092	0.138	0.164	0.193	0.256
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41

8" Round Inlet	Airflow (CFM)	100	120	140	160	180	220	240	260	300
60" x 12" Module	Total Pressure	0.014	0.020	0.027	0.036	0.045	0.068	0.081	0.095	0.126
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
48" x 24" Module	Total Pressure	0.010	0.015	0.020	0.026	0.033	0.049	0.058	0.068	0.091
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
24" x 60" Module	Total Pressure	0.009	0.014	0.018	0.024	0.030	0.046	0.054	0.064	0.085
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21

10" Round Inlet	Airflow (CFM)	215	240	265	295	320	345	400	425	515
48" x 24" Module	Total Pressure	0.024	0.030	0.036	0.045	0.053	0.062	0.083	0.094	0.137
	NC (Noise Criteria)	-	-	-	-	-	-	-	21	28
60" x 24" Module	Total Pressure	0.021	0.026	0.032	0.039	0.046	0.054	0.072	0.081	0.119
	NC (Noise Criteria)	-	-	-	-	-	-	-	21	28

12" Round Inlet	Airflow (CFM)	215	240	265	295	320	345	400	425	515
48" x 24" Module	Total Pressure	0.016	0.020	0.024	0.030	0.035	0.041	0.055	0.062	0.091
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
60" x 24" Module	Total Pressure	0.013	0.016	0.019	0.024	0.028	0.033	0.044	0.050	0.073
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21

PERFORMANCE NOTES

- Performance data includes pressure loss associated with optional snap-in equalization baffle
- Performance data does not account for optional filter pressure loss
- Data obtained in accordance with ASHRAE Standard 70-2006
- NC Values are based on a room absorption of 10 dB
- NC levels less than 15 dB are shown as "-"
- All pressures are in inches of water

TLFR-AA-LED / TLFR-SS-LED WITH 23% PERFORATED FACE

6" Round Inlet	Airflow (CFM)	100	120	140	160	180	220	240	260	300
48" x 12" Module	Total Pressure	0.031	0.044	0.060	0.078	0.099	0.148	0.176	0.207	0.276
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41
24" x 24" Module	Total Pressure	0.030	0.043	0.059	0.077	0.098	0.146	0.174	0.204	0.272
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41
24" x 48" Module	Total Pressure	0.027	0.040	0.054	0.070	0.089	0.133	0.158	0.186	0.247
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41

8" Round Inlet	Airflow (CFM)	100	120	140	160	180	220	240	260	300
60" x 12" Module	Total Pressure	0.011	0.015	0.021	0.027	0.035	0.052	0.062	0.073	0.097
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
48" x 24" Module	Total Pressure	0.009	0.013	0.018	0.023	0.029	0.044	0.052	0.061	0.081
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
24" x 60" Module	Total Pressure	0.009	0.013	0.017	0.022	0.028	0.042	0.050	0.059	0.079
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21

10" Round Inlet	Airflow (CFM)	215	240	265	295	320	345	400	425	515
48" x 24" Module	Total Pressure	0.019	0.024	0.029	0.036	0.042	0.049	0.066	0.075	0.110
	NC (Noise Criteria)	-	-	-	-	-	-	-	21	28
60" x 24" Module	Total Pressure	0.018	0.022	0.027	0.033	0.039	0.046	0.061	0.069	0.102
	NC (Noise Criteria)	-	-	-	-	-	-	-	21	28

12" Round Inlet	Airflow (CFM)	215	240	265	295	320	345	400	425	515
48" x 24" Module	Total Pressure	0.011	0.014	0.017	0.021	0.024	0.028	0.038	0.043	0.063
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
60" x 24" Module	Total Pressure	0.010	0.012	0.015	0.018	0.021	0.025	0.034	0.038	0.056
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21

PERFORMANCE NOTES

- Performance data includes pressure loss associated with optional snap-in equalization baffle
- Performance data does not account for optional filter pressure loss
- Data obtained in accordance with ASHRAE Standard 70-2006
- NC Values are based on a room absorption of 10 dB
- NC levels less than 15 dB are shown as "-"
- All pressures are in inches of water

TLFR-AA-LED / TLFR-SS-LED WITH 33% PERFORATED FACE

6" Round Inlet	Airflow (CFM)	100	120	140	160	180	220	240	260	300
48" x 12" Module	Total Pressure	0.029	0.042	0.058	0.075	0.095	0.142	0.169	0.198	0.264
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41
24" x 24" Module	Total Pressure	0.029	0.042	0.057	0.074	0.094	0.141	0.167	0.196	0.262
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41
24" x 48" Module	Total Pressure	0.027	0.039	0.053	0.070	0.088	0.132	0.157	0.184	0.245
	NC (Noise Criteria)	-	-	-	-	23	30	33	36	41

8" Round Inlet	Airflow (CFM)	100	120	140	160	180	220	240	260	300
60" x 12" Module	Total Pressure	0.010	0.014	0.020	0.025	0.032	0.048	0.057	0.067	0.090
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
48" x 24" Module	Total Pressure	0.009	0.013	0.017	0.023	0.029	0.043	0.051	0.059	0.079
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
24" x 60" Module	Total Pressure	0.009	0.012	0.017	0.022	0.028	0.042	0.050	0.058	0.077
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21

10" Round Inlet	Airflow (CFM)	215	240	265	295	320	345	400	425	515
48" x 24" Module	Total Pressure	0.018	0.022	0.027	0.034	0.040	0.046	0.062	0.070	0.103
	NC (Noise Criteria)	-	-	-	-	-	-	-	21	28
60" x 24" Module	Total Pressure	0.017	0.021	0.026	0.032	0.038	0.044	0.059	0.066	0.098
	NC (Noise Criteria)	-	-	-	-	-	-	-	21	28

12" Round Inlet	Airflow (CFM)	215	240	265	295	320	345	400	425	515
48" x 24" Module	Total Pressure	0.010	0.012	0.015	0.019	0.022	0.025	0.034	0.039	0.057
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21
60" x 24" Module	Total Pressure	0.009	0.011	0.014	0.017	0.020	0.023	0.031	0.035	0.051
	NC (Noise Criteria)	-	-	-	-	-	-	-	-	21

PERFORMANCE NOTES

- Performance data includes pressure loss associated with optional snap-in equalization baffle
- Performance data does not account for optional filter pressure loss
- Data obtained in accordance with ASHRAE Standard 70-2006
- NC Values are based on a room absorption of 10 dB
- NC levels less than 15 dB are shown as "-"
- All pressures are in inches of water