MIXED FLOW FANS

QSL (Standard) | QSLR (Restaurant) | QSLSH (Smoke and Heat)
**Benefits of Mixed Flow Fans**

Twin City Fan Model QSL Mixed Flow Fan combines the benefits of axial flow and centrifugal flow fans. The QSL has the advantage of the compact design and straight-through airflow as well as the preferred acoustic characteristics and high pressure capability. QSL fans offer superior air and sound performance and the AMCA certified rating seal for air and sound.

**Energy Savings**

Mixed flow fans offer the economy of operation with a higher and broader efficiency range. The lower operating speed for a given performance provides longer and more reliable operation.

**Ultra Quiet**

The AMCA Certified Ratings for Air and Sound applies to both inlet and outlet sound power levels. The table below displays sound and static efficiency differences between performance points for a comparable tubular centrifugal fan and a vane axial fan.

### Mixed Flow Models

**QSL** – Available in both direct drive and belt driven. The QSL mounts both vertically and horizontally, allowing for numerous applications with multiple mounting arrangements. Sizes range from 150 - 730 and performance ranges from 0.6 to 75 m³/sec. Model QSL is UL/cUL 705 listed.

**QSLR** – Model QSLR is similar to the QSL but is specifically designed for exhausting grease-laden air from kitchens, restaurants and cooking and dishwasher hoods. Model QSLR is UL/cUL 762 listed for the exhaust of grease-laden air.

**QSLSH** – Model QSLSH is specifically designed for smoke control applications. UL/CUL listed for smoke control systems for 250°C for 4 hours or 525°C for 15 minutes.

### Models

**QSL | QSLR | QSLSH**

### Table: Performance Data

<table>
<thead>
<tr>
<th>Performance</th>
<th>Size</th>
<th>Static Efficiency (%)</th>
<th>Sound LwA (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>QSL</td>
<td>TSL</td>
</tr>
<tr>
<td>2.35 m³/sec</td>
<td>QSL 245</td>
<td>70</td>
<td>55</td>
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<tr>
<td>4.72 m³/sec</td>
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<td>70</td>
<td>63</td>
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<td>11.80 m³/sec</td>
<td>QSL 402</td>
<td>72</td>
<td>68</td>
</tr>
<tr>
<td>23.60 m³/sec</td>
<td>QSL 490</td>
<td>71</td>
<td>69</td>
</tr>
</tbody>
</table>

### Application

Mixed flow fans are becoming a popular choice on many air supply, return, general and grease-laden exhaust and laboratory exhaust applications in the HVAC industry for both constant or variable air volume systems. The efficiency and sound characteristics of the mixed flow fans are often desired in buildings such as hospitals, libraries, theaters, and general offices. The Twin City Fan heavy-duty construction of QSL fans also make them suitable for many industrial applications handling ambient air. Applications involving fumes, spray booth exhaust, particulate, heavy moisture content, or high temperature should be discussed with the factory for possible product modifications.

Twin City Fan & Blower certifies that the Models QSL, QSLR and QSLSH Mixed Flow Fans shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. See Catalogue 1061 for sound ratings.

Model QSL is available with the UL/cUL 705 listing for electrical, File No. E158680.

Model QSLR is UL/cUL 762 listed for the exhaust of grease-laden air as standard, File No. MH-25478.

Model QSLSH is UL/cUL listed for Smoke Control Systems as standard, File No. MH-29313, 250°C for 4 hours and 525°C for 15 minutes.
**Housings**

All fans are constructed of heavy-gauge steel and continuously welded for strength and rigidity. All QSL fans are provided with punched inlet and outlet flanges as standard.

**Impeller**

The QSL impeller is designed with true aerofoil (double surface - hollow) die-formed, continuously-welded blades for a stable air performance throughout the operating range. The impeller is statically and dynamically balanced prior to assembly and rechecked for balance after assembly by Twin City Fan & Blower.

**Belt Guard**

Totally enclosed, sealed belt guard is standard on Model QSL. Totally enclosed, non-sealed belt guard is standard on Models QSLR and QSLSH.

**Inner Cylinder**

The inner tube is rigidly constructed to support the shaft and bearings. The removable discharge cone provides full access to the shaft, bearings, and fan sheave. It is strongly recommended that an access door be provided in the ductwork adjacent to the discharge end of the fan for such service.

**Bearings**

Standard bearings are selected to exceed the L-10 life of 40,000 hours at the maximum operating speed.

**Drives**

V-belt drives or direct drive fans with motors and drives mounted by Twin City Fan Companies are test run as a complete assembly and rechecked for balance.

**Straightening Vanes**

Straightening vanes convert tangential velocity pressure into useful static pressure, reducing turbulence and increasing efficiency. Extensive testing of various shapes and locations has resulted in the most efficient aerodynamic design of the straightening vanes.

**Extended Lube Lines**

Allow for ease of lubrication on all sizes.

**Motor Mounting Platform**

A heavy-duty motor mounting platform pivots to offer easy and positive adjustment of belt tension. The motor mounting platform is offered in eight standard locations to allow for motor accessibility and space requirements.

**Shaft**

Shaft diameter sized so that maximum operating speed does not exceed 70% of first critical speed.

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**EASY ACCESS DESIGNS**

**Clamshell Design**

Two clamshell style doors swing open wide to provide complete access to the interior of the fan for maintenance or cleaning without removal of ductwork. Heavy duty hinges, positive locking latches, and a full gasket provides a complete seal when doors are closed. An access door provides access to the bearings. Available on all fan sizes, typically vertical mount.

**Swing-out Design**

Provides full access to the impeller and inner casing. The entire impeller/ shaft/ bearing assembly is mounted on a large swing-out door. Ideal for systems requiring frequent cleaning without removal of ductwork. Swing-out construction is available for vertical mounting only. Available on sizes 182 and larger.
### Horizontal Construction
Horizontal construction is available in sizes 150 to 730.

**Horizontal Base Mounted (HBM)** — Support legs are provided at each end of the fan for floor mounting.

**Horizontal Ceiling Hung (HCH)** — For duct mounted fans, four suspension clips are welded to the fan casing to allow ceiling suspension using rod hangers.

**Horizontal (HOR)** — For mounting configurations where support legs and suspension clips are not required.

### Vertical Construction
Vertical construction is available in sizes 150 to 542. Consult factory for larger sizes.

**Floor or Ceiling Mounted (VUI/VUO/VDI/VDO)** — Four vertical brackets are welded to either end of the fan housing. Bracket location is determined by airflow direction and support details (see drawing below).

**Roof Mounted (VRM)** — A curb cap provides weather-tight seal for roof curb mounted fans. A discharge cap and weather cover are also available for the up-blast style roof ventilator.

**Vertical (VUN/VDN)** — For mounting configurations where support brackets are not required.

### Discharge Arrangements

#### Available Discharges by Model

<table>
<thead>
<tr>
<th>QSL</th>
<th>QSLH</th>
<th>QSLR</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBM</td>
<td>HBM</td>
<td>HBM</td>
</tr>
<tr>
<td>HCH</td>
<td>HCH</td>
<td>HCH</td>
</tr>
<tr>
<td>HOR</td>
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</tr>
<tr>
<td>VUN</td>
<td>VUN</td>
<td>VUN</td>
</tr>
<tr>
<td>VUO</td>
<td>VUO</td>
<td>VUO</td>
</tr>
<tr>
<td>VRM</td>
<td>VRM</td>
<td>VRM</td>
</tr>
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</table>

**NOTE:** Horizontal motor positions shown from outlet end.
Belt Tube
A belt tube encloses the belts and drive components, protecting them from the airstream.

Support Legs — Horizontal Flow
For horizontal flow with floor mounting, support legs are welded to the fan flange with bolt holes aligned for connection of ductwork.

Support Legs — Vertical Flow
For vertical flow with either floor or ceiling mounting, support legs are welded to the fan housing for four-point support.

Suspension Clips
For horizontal flow with ceiling mounting, four clips of formed angle are welded to the fan housing for suspension via tie rods to the ceiling support structure.

Inlet and Outlet Screens
Safety screening can be provided for installation in the fan inlet or fan outlet.

Discharge Cap
Discharge caps are designed for vertical, rooftop discharge with butterfly type dampers to seal out the weather when the fan is shut off.

Curb Cap
Attached to the fan’s flange for curb mounting.

Shaft Seal
To limit the air entering the inner cylinder and avoid contact of airstream contaminants with the bearings and V-belt drive. Consists of a Teflon wear pad/plate and a rubber check-seal at the impeller end of the inner cylinder. Please note that a shaft seal does not make the inner cylinder gas tight.

Weather Cover
For outdoor installations, the weather cover completely encloses the motor and V-belt drive from the elements. Provided with slots for ventilation. Weather covers are available for either horizontal or vertical flow fans.

Companion Flanges
Flanges are rolled angle rings, drilled to match the fan’s inlet or outlet flange.

Spark-Resistant Construction
Various grades of spark resistance are as dictated by AMCA: Types A, B, and C (for ATEX, please enquire). Spark resistant construction requires the addition of a sealed belt tube.

Vibration Isolation
Spring or rubber-in-shear isolators as an option. Spring isolators can be provided for floor mount or ceiling hung orientation.

Seismic Certification
Models QSL, QSLR and QSLSH have been seismically tested and certified with the California Office of Statewide Health, Planning and Development (OSHPD) per OSP-0271-10. Seismic certification is limited to certain product options and configurations.
QSLR Restaurant Fans
Twin City Fan Companies offers a specially modified version of the QSL fan designated as "QSLR" (Mixed Flow Restaurant Exhaust) for exhausting grease-laden air from kitchens, restaurants, cooking and dishwasher hoods. QSLR is available in sizes 150 to 730.

Model QSLR is cULus 762 listed for exhaust of grease-laden air. QSLR is licensed to bear the AMCA certified ratings seal for sound and air performance.

The QSLR fan is available in all configurations with the exception of vertical down (VDN, VDO and VDI).

Standard Product Features
- Belt guard, totally enclosed, ventilated (weather cover for VRM)
- Belt tube, sealed
- Two cleanout doors located 180° apart (90° from motor)
- 50 mm drain located 180° from motor (lowest point for horizontal) vertical at the funnel
- Cooling fins on impeller
- Housing sealed with Hi-Temp caulk

QSLSH Smoke & Heat Fans
Twin City Fan Companies offers a specially modified version of the QSL fan designated as "QSLSH" (Mixed Flow Smoke and Heat Exhaust) for smoke control applications where temperatures can reach 525°C. QSLSH is available in sizes 150 to 730.

Model QSLSH is cULus 705 listed and cULus listed for smoke control systems for 250°C for 4 hours or 525°C for 15 minutes. Vertical roof mounted configuration, with discharge cap, meets UL 793 Snow Load Test requirements for butterfly dampers. QSLSH is licensed to bear the AMCA certified ratings seal for sound and air performance.

The QSLSH fan is available in all configurations with the exception of vertical down (VDN, VDO and VDI).

Standard Product Features
- Belt guard, ventilated (weather cover for VRM)
- Belt tube, sealed
- Two-groove drive minimum w/2.0 SF
- Cooling fins on impeller
- Stack cap with fusible link (for VRM)
- Continuously welded housing

QSLR/QSLSH FANS

![Diagram of QSLR/QSLSH Fans](image-url)
Insulated Enclosure
To further reduce case radiated sound and motor noise, an optional Insulated Enclosure is available. The enclosure consists of a box with 50 mm thick, dual density fiberglass. Consult the factory for dimensions and sound reduction values.

Arrangement 4 (Direct Drive)
Where space constraints require the use of a complete "in line" fan or the desire is for a simple, dependable fan with minimum maintenance requirements, the direct drive Arrangement 4 QSL is available. Constructed with the fan impeller mounted directly on the motor shaft, this fan provides premium efficiency with minimal obstructions in the airstream. The use of a variable frequency drive (VFD) may be necessary for some applications.

Arrangement 3
Where space is a premium, the QSL arrangement 3 is available to shorten the overall fan length. The table on the right shows the overall savings in length versus an arrangement 9 fan.

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<th>Arr. 3 Overall Length (TA)</th>
<th>Length Savings (mm)</th>
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<tr>
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### Table 1: Maximum RPM, Impeller Weights, and WR² (moment of inertia in kg-m²)

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<th>CLASS II</th>
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### Table 2: Bare Fan Weights (kg)

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### Table 3: Temperature and Altitude Density Ratios

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<th>1200</th>
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<th>1750</th>
<th>2000</th>
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<td>101.32</td>
<td>97.37</td>
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<tr>
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### Table 4: Bearing Specifications

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<th>FAN SIZE</th>
<th>SHAFT DIA. (mm.)</th>
<th>CLASS I</th>
<th>CLASS II</th>
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<td>SHFT DIA. (mm.)</td>
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<td>SDB</td>
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<td>SDB</td>
<td>SDB</td>
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<td>182</td>
<td>25</td>
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<td>SDB</td>
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<tr>
<td>200</td>
<td>30</td>
<td>SDB</td>
<td>SDB</td>
</tr>
<tr>
<td>222</td>
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<td>SDB</td>
<td>SDB</td>
</tr>
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<td>SDB</td>
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</tr>
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<td>SDB</td>
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<td>38</td>
<td>HDB</td>
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<td>42</td>
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<td>730</td>
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### Table 5: Minimum m³/sec Required to Open Discharge Cap

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<th>FAN SIZE</th>
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**NOTES:**

1. **BEARINGS CODES:**
   - SDB — Standard-Duty Ball such as Dodge SCAH or SKF SY Series
   - HDB — Heavy-Duty Ball such as Dodge SCMAH or SKF SYM Series
   - RB — Roller Bearing such as Dodge S2000 or SKF SYR Series
2. Standard bearings are selected to exceed L-10 life of 40,000 hours at the maximum operating speed.
Notes:
1. Performance certified is for Installation Type B & D: Free or ducted inlet, ducted outlet.
2. Power rating (kW) does not include transmission losses.
3. Performance ratings do not include the effects of appurtenances (accessories).
4. The sound power level ratings shown are in decibels, referred to 10 e-12 watts calculated per AMCA Standard 301.
5. Values shown are for inlet LwiA sound power levels for Installation Type B: Free inlet, ducted outlet.
6. Ratings do not include the effects of duct end correction.
7. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.
**Notes:**

1. Performance certified is for Installation Type B & D: Free or ducted inlet, ducted outlet.
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1. Performance certified is for Installation Type B & D: Free or ducted inlet, ducted outlet.
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7. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.
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1. Performance certified is for Installation Type B & D: Free or ducted inlet, ducted outlet.
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4. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.
5. Values shown are for inlet Lwa sound power levels for Installation Type B: Free inlet, ducted outlet.
6. Ratings do not include the effects of duct end correction.
7. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.
Notes:
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Fan Efficiency Grade = FEG 75
Notes:
1. Performance certified is for Installation Type B & D: Free or ducted inlet, ducted outlet.
2. Power rating (kW) does not include transmission losses.
3. Performance ratings do not include the effects of appurtenances (accessories).
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7. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.
Notes:
1. Performance certified is for Installation Type B & D: Free or ducted inlet, ducted outlet.
2. Power rating (kW) does not include transmission losses.
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4. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.
5. Values shown are for inlet LwA sound power levels for Installation Type B: Free inlet, ducted outlet.
6. Ratings do not include the effects of duct end correction.
7. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

Fan Efficiency Grade = FEG 75
Notes:
1. Performance certified is for Installation Type B & D: Free or ducted inlet, ducted outlet.
2. Power rating (kW) does not include transmission losses.
3. Performance ratings do not include the effects of appurtenances (accessories).
4. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.
5. Values shown are for inlet LwiA sound power levels for Installation Type B: Free inlet, ducted outlet.
6. Ratings do not include the effects of duct end correction.
7. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

Fan Efficiency Grade = FEG 75
Notes:
1. Performance certified is for Installation Type B & D: Free or ducted inlet, ducted outlet.
2. Power rating (kW) does not include transmission losses.
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6. Ratings do not include the effects of duct end correction.
7. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

Fan Efficiency Grade = FEG 80
Notes:
1. Performance certified is for Installation Type B & D: Free or ducted inlet, ducted outlet.
2. Power rating (kW) does not include transmission losses.
3. Performance ratings do not include the effects of appurtenances (accessories).
4. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.
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1. Performance certified is for Installation Type B & D: Free or ducted inlet, ducted outlet.
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7. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

Fan Efficiency Grade = FEG 80

PERFORMANCE CURVES
Notes:
1. Performance certified is for Installation Type B & D: Free or ducted inlet, ducted outlet.
2. Power rating (kW) does not include transmission losses.
3. Performance ratings do not include the effects of appurtenances (accessories).
4. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.
5. Values shown are for inlet LwA sound power levels for Installation Type B: Free inlet, ducted outlet.
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7. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

Fan Efficiency Grade = FEG 80
Notes:
1. Performance certified is for Installation Type B & D: Free or ducted inlet, ducted outlet.
2. Power rating (kW) does not include transmission losses.
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Fan Efficiency Grade = FEG 80
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6. Ratings do not include the effects of duct end correction.
7. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

Fan Efficiency Grade = FEG 80
DIMENSIONAL DATA

Horizontal

Sealed belt guard std except for spark resistant construction

Type "QSL" horizontal discharge

Motor location viewed from outlet end

Dimensions are subject to change. Certified drawings available on request.

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QSL-AC1000023E
QSLR-AC1001672A
QSLSH-AC1001666B

Dimensions are subject to change. Certified drawings available on request.
Vertical

**Type "QSL" Vertical Up Discharge With Floor Mount Support Legs**

**Notes:**
1. One locking collar and impeller hub cap included to prevent shifting of components.
2. Support legs shown are provided as an accessory.

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*QSL-AC1000024F*
*QSLR-AC1001675B*
*QSLSH-AC1001667C*

Dimensions are subject to change. Certified drawings available on request.
DIMENSIONAL DATA

NOTES:
1. One locking collar and impeller hub cap included to prevent shifting of components.
2. Discharge cap and curb cap are optional accessories.

SIZE | BL | BT | CA | CB | CC | CD | CE | CG | CH | CJ | CK | DH | FR | MC | NH | SD | CLI | CLI | TA | TH
150 | 645 | 165 | 514 | 562 | 594 | 695 | 762 | 1238 | 152 | 381 | 14 | 132M | 654 | 8 | 25 | 30 | 705 | 10
165 | 710 | 165 | 567 | 619 | 654 | 573 | 784 | 813 | 1395 | 160 | 457 | 18 | 132M | 704 | 8 | 25 | 35 | 771 | 10
182 | 838 | 165 | 627 | 679 | 711 | 632 | 886 | 964 | 1486 | 168 | 457 | 18 | 160L | 875 | 12 | 25 | 35 | 861 | 12
200 | 1000 | 165 | 693 | 745 | 777 | 892 | 1016 | 1649 | 171 | 533 | 21 | 160L | 919 | 12 | 30 | 35 | 945 | 12
222 | 1158 | 203 | 764 | 816 | 848 | 768 | 1026 | 1016 | 1726 | 171 | 533 | 21 | 160L | 956 | 12 | 30 | 35 | 1021 | 12
245 | 1310 | 227 | 842 | 892 | 924 | 846 | 1102 | 1168 | 1913 | 178 | 610 | 21 | 180L | 962 | 12 | 35 | 42 | 1125 | 12
270 | 1517 | 248 | 927 | 978 | 1010 | 932 | 1187 | 1168 | 2034 | 184 | 610 | 21 | 180L | 1071 | 12 | 35 | 42 | 1240 | 12
300 | 1787 | 278 | 1100 | 1096 | 1140 | 1037 | 1295 | 1346 | 2268 | 197 | 686 | 21 | 200L | 1146 | 16 | 35 | 50 | 1366 | 10
330 | 2024 | 305 | 1294 | 1200 | 1245 | 1140 | 1400 | 1499 | 2480 | 197 | 762 | 21 | 200L | 1183 | 16 | 42 | 55 | 1521 | 10
365 | 2337 | 337 | 1454 | 1321 | 1365 | 1261 | 1521 | 1524 | 2645 | 197 | 762 | 21 | 225M | 1308 | 16 | 50 | 55 | 1686 | 10
402 | 2645 | 375 | 1631 | 1461 | 1518 | 1388 | 1648 | 1702 | 2896 | 203 | 838 | 21 | 225M | 1518 | 16 | 50 | 55 | 1854 | 10
445 | 3019 | 413 | 1829 | 1607 | 1664 | 1535 | 1769 | 1854 | 3166 | 216 | 914 | 21 | 250M | 1580 | 16 | 50 | 60 | 2056 | 10
490 | 3456 | 457 | 2038 | 1762 | 1819 | 1689 | 1981 | 2032 | 3505 | 229 | 1016 | 21 | 250M | 1719 | 24 | 55 | 65 | 2235 | 10
542 | 3966 | 505 | 2264 | 1956 | 2026 | 1870 | 2254 | 2197 | 4002 | 235 | 1261 | 21 | 280M | 2016 | 24 | 65 | 70 | 2507 | 10

NOTES:
1. One locking collar and impeller hub cap included to prevent shifting of components.
2. Discharge cap and curb cap are optional accessories.

DIMENSIONS ARE SUBJECT TO CHANGE. CERTIFIED DRAWINGS AVAILABLE ON REQUEST.
Fans shall be Type QSL (standard mixed flow) of the non-overloading design, as manufactured by Twin City Fan Companies.

**PERFORMANCE** — Performance ratings shall conform to AMCA Standard 205 (fan efficiency grade), 211 (air performance) and 311 (sound performance). Fans shall be tested in accordance with ANSI/AMCA Standard 210 (air performance) and 300 (sound performance) in an AMCA accredited laboratory. Fans shall be licensed to bear the AMCA certified ratings seal for both sound and air, and fan efficiency grade (FEG). Sound certification shall apply to both inlet and outlet sound power levels.

Fans shall be designed for maximum efficiency. Fans shall have a sharply rising pressure characteristic extending through the operating range and continuing to rise well beyond the efficiency peak to assure quiet and stable operation under all conditions. Power characteristics shall be truly self-limiting and shall reach a peak in the normal selection area.

Model QSL shall be available UL 705 listed. Fans shall bear a permanently attached nameplate displaying model and serial number of the unit for future identification.

**HOUSING** — Housings shall be cylindrical and welded steel throughout. Inlets shall be fully streamlined. Housings shall be suitably braced to prevent vibration or pulsation. Totally enclosed belt guard shall enclose motor sheave and V-belt drives. Punched inlet and outlet flanges shall be equipped for duct mounting. Extended lube lines shall be provided for ease of lubrication. Model QSL shall include bolted access door for inspection and maintenance of impeller.

**IMPELLER** — Fan impellers shall have die-formed hollow aerofoil blades designed for maximum efficiency, and quiet and stable operation. Blades shall be continuously welded to the back plate and impeller cone. Impellers shall be statically and dynamically balanced and the complete fan assembly including motor and drive shall be test balanced at or near the operating speed at the factory prior to shipment.

**SHAFT** — Shafts shall be AISI 1040 or 1045 hot rolled steel, accurately turned, ground, polished, and ring gauged for accuracy. Shafts shall be sized for the first critical speed of at least 1.43 times the maximum speed.

**BEARINGS** — Bearings shall be heavy duty, grease lubricated, anti-friction ball or roller, self-aligning, pillow block type and selected for a minimum L-10 life of 40,000 hours at the maximum fan RPM. Bearings shall be equipped with extended lubrication lines with grease fittings outside of the fan housing.

**DRIVE** — Motor sheaves shall be cast iron, variable pitch on applications 7.5 kW and smaller, and fixed pitch on 11 kW and larger.

**INLET VANES** — Inlet vanes, where specified, shall be of the nested design. Inlet vanes shall be designed for economical, stable, and efficient air volume control at partial load conditions.

**FINISH AND COATING** — The entire fan assembly, excluding the shaft, shall be thoroughly degreased and de-burred before application of a rust-preventative primer. After the fan is completely assembled, a finish coat of paint shall be applied to the entire assembly. The fan shaft shall be coated with a petroleum-based rust protectant. Aluminum components shall be unpainted.

**FACTORY RUN TEST** — All fans with motors and drives mounted by Twin City Fan & Blower shall be completely assembled and test run as a unit at the specified operating speed prior to shipment. Each impeller shall be statically and dynamically balanced in accordance with ANSI/AMCA 204-96 “Balance Quality and Vibration Levels for Fans” to Fan Application Category BV-3, Balance Quality Grade G6.3. Balance readings shall be taken by electronic type equipment in the axial, vertical, and horizontal directions on each of the bearings. Records shall be maintained and a written copy shall be available upon request.

**GUARANTEE** — The manufacturer shall guarantee the workmanship and materials for its QSL Mixed Flow Fans for at least one (1) year from startup or eighteen (18) months from shipment, whichever occurs first.
Fans shall be Type QSLR (restaurant) of the non-overloading design, as manufactured by Twin City Fan Companies.

**PERFORMANCE** — Performance ratings shall conform to AMCA Standard 205 (fan efficiency grade), 211 (air performance) and 311 (sound performance). Fans shall be tested in accordance with ANSI/AMCA Standard 210 (air performance) and 300 (sound performance) in an AMCA accredited laboratory. Fans shall be licensed to bear the AMCA certified ratings seal for both sound and air, and fan efficiency grade (FEG). Sound certification shall apply to both inlet and outlet sound power levels.

Fans shall be designed for maximum efficiency. Fans shall have a sharply rising pressure characteristic extending through the operating range and continuing to rise well beyond the efficiency peak to assure quiet and stable operation under all conditions. Power characteristics shall be truly self-limiting and shall reach a peak in the normal selection area.

Model QSLR shall be UL 762 listed for the exhaust of grease-laden air. Fans shall bear a permanently attached nameplate displaying model and serial number of the unit for future identification.

**HOUSING** — Housings shall be cylindrical and welded steel throughout. Inlets shall be fully streamlined. Housings shall be suitably braced to prevent vibration or pulsation. Totally enclosed belt guard shall enclose motor sheave and V-belt drives. Punched inlet and outlet flanges shall be equipped for duct mounting. Extended lube lines shall be provided for ease of lubrication. Model QSLR shall include a belt tube, 2 impeller cleanout doors (located 180° apart) for inspection and maintenance of the impeller and a 2" drain.

**IMPELLER** — Fan impellers shall have die-formed hollow aerofoil blades designed for maximum efficiency, and quiet and stable operation. Blades shall be continuously welded to the back plate and impeller cone. Impellers shall be statically and dynamically balanced and the complete fan assembly including motor and drive shall be test balanced at or near the operating speed at the factory prior to shipment. Impellers on model QSLR shall have cooling fins to draw cool air over shaft and bearings.

**SHAFT** — Shafts shall be AISI 1040 or 1045 hot rolled steel, accurately turned, ground, polished, and ring gauged for accuracy. Shafts shall be sized for the first critical speed of at least 1.43 times the maximum speed.

**BEARINGS** — Bearings shall be heavy duty, grease lubricated, anti-friction ball or roller, self-aligning, pillow block type and selected for a minimum L-10 life of 40,000 hours at the maximum fan RPM. Bearings shall be equipped with extended lubrication lines with grease fittings outside of the fan housing.

**DRIVE** — Motor sheaves shall be cast iron, variable pitch on applications 7.5 kW and smaller, and fixed pitch on 11 kW and larger.

**INLET VANES** — Inlet vanes, where specified, shall be of the nested design. Inlet vanes shall be designed for economical, stable, and efficient air volume control at partial load conditions.

**FINISH AND COATING** — The entire fan assembly, excluding the shaft, shall be thoroughly degreased and de-burred before application of a rust-preventative primer. After the fan is completely assembled, a finish coat of paint shall be applied to the entire assembly. The fan shaft shall be coated with a petroleum-based rust protectant. Aluminum components shall be unpainted.

**FACTORY RUN TEST** — All fans with motors and drives mounted by Twin City Fan & Blower shall be completely assembled and test run as a unit at the specified operating speed prior to shipment. Each impeller shall be statically and dynamically balanced in accordance with ANSI/AMCA 204-96 “Balance Quality and Vibration Levels for Fans” to Fan Application Category BV-3, Balance Quality Grade G6.3. Balance readings shall be taken by electronic type equipment in the axial, vertical, and horizontal directions on each of the bearings. Records shall be maintained and a written copy shall be available upon request.

**GUARANTEE** — The manufacturer shall guarantee the workmanship and materials for its QSLR Mixed Flow Fans for at least one (1) year from startup or eighteen (18) months from shipment, whichever occurs first.
Fans shall be Type QSLSH (smoke and heat) of the non-overloading design, as manufactured by Twin City Fan Companies.

**PERFORMANCE** — Performance ratings shall conform to AMCA Standard 205 (fan efficiency grade), 211 (air performance) and 311 (sound performance). Fans shall be tested in accordance with ANSI/AMCA Standard 210 (air performance) and 300 (sound performance) in an AMCA accredited laboratory. Fans shall be licensed to bear the AMCA certified ratings seal for both sound and air, and fan efficiency grade (FEG). Sound certification shall apply to both inlet and outlet sound power levels.

Fans shall be designed for maximum efficiency. Fans shall have a sharply rising pressure characteristic extending through the operating range and continuing to rise well beyond the efficiency peak to assure quiet and stable operation under all conditions. Power characteristics shall be truly self-limiting and shall reach a peak in the normal selection area.

Model QSLSH shall be UL listed for Smoke Control Systems ((250°C for 4 hours and 525°C for 15 minutes). Fans shall bear a permanently attached nameplate displaying model and serial number of the unit for future identification.

**HOUSING** — Housings shall be cylindrical and welded steel throughout. Inlets shall be fully streamlined. Housings shall be suitably braced to prevent vibration or pulsation. Totally enclosed belt guard shall enclose motor sheave and V-belt drives. Punched inlet and outlet flanges shall be equipped for duct mounting. Extended lube lines shall be provided for ease of lubrication. Model QSLSH shall include a belt tube for the protection of belts and drive components from the airstream and bolted access door.

**IMPELLER** — Fan impellers shall have die-formed hollow aerofoil blades designed for maximum efficiency, and quiet and stable operation. Blades shall be continuously welded to the back plate and impeller cone. Impellers shall be statically and dynamically balanced and the complete fan assembly including motor and drive shall be test balanced at or near the operating speed at the factory prior to shipment. Impellers on model and QSLSH shall have cooling fins to draw cool air over shaft and bearings.

**SHAFT** — Shafts shall be AISI 1040 or 1045 hot rolled steel, accurately turned, ground, polished, and ring gauged for accuracy. Shafts shall be sized for the first critical speed of at least 1.43 times the maximum speed.

**BEARINGS** — Bearings shall be heavy duty, grease lubricated, anti-friction ball or roller, self-aligning, pillow block type and selected for a minimum L-10 life of 40,000 hours at the maximum fan RPM. Bearings shall be equipped with extended lubrication lines with grease fittings outside of the fan housing.

**DRIVE** — Motor sheaves shall be cast iron, variable pitch on applications 7.5 kW and smaller, and fixed pitch on 11 kW and larger. Model QSLSH shall be equipped with a two-groove drive minimum.

**INLET VANES** — Inlet vanes, where specified, shall be of the nested design. Inlet vanes shall be designed for economical, stable, and efficient air volume control at partial load conditions.

**FINISH AND COATING** — The entire fan assembly, excluding the shaft, shall be thoroughly degreased and de-burred before application of a rust-preventative primer. After the fan is completely assembled, a finish coat of paint shall be applied to the entire assembly. The fan shaft shall be coated with a petroleum-based rust protectant. Aluminum components shall be unpainted.

**FACTORY RUN TEST** — All fans with motors and drives mounted by Twin City Fan & Blower shall be completely assembled and test run as a unit at the specified operating speed prior to shipment. Each impeller shall be statically and dynamically balanced in accordance with ANSI/AMCA 204-96 “Balance Quality and Vibration Levels for Fans” to Fan Application Category BV-3, Balance Quality Grade G6.3. Balance readings shall be taken by electronic type equipment in the axial, vertical, and horizontal directions on each of the bearings. Records shall be maintained and a written copy shall be available upon request.

**GUARANTEE** — The manufacturer shall guarantee the workmanship and materials for its QSLSH Mixed Flow Fans for at least one (1) year from startup or eighteen (18) months from shipment, whichever occurs first.
INDUSTRIAL PROCESS AND COMMERCIAL VENTILATION SYSTEMS

CENTRIFUGAL FANS | UTILITY SETS | PLENUM & PLUG FANS | INLINE CENTRIFUGAL FANS
MIXED FLOW FANS | TUBEAXIAL & VANEAXIAL FANS | PROPELLER WALL FANS | PROPELLER ROOF VENTILATORS
CENTRIFUGAL ROOF & WALL EXHAUSTERS | CEILING VENTILATORS | GRAVITY VENTILATORS | DUCT BLOWERS
RADIAL BLADED FANS | RADIAL TIP FANS | HIGH EFFICIENCY INDUSTRIAL FANS | PRESSURE BLOWERS
LABORATORY EXHAUST FANS | FILTERED SUPPLY FANS | MANCOOLERS | FIBERGLASS FANS | CUSTOM FANS