**Application Considerations For Cooling Tower Intake And Discharge Silencer**

OLSON Acoustics cooling tower discharge silencers are constructed of stainless steel SUS304 or SUS316 to prevent corrosion from continuous exposure to warm and saturated air from the cooling tower. The silencer installed to the cooling tower discharged is commonly located at a very high level above the roof. As such, it is very challenging and extremely costly to maintain and replace. For this reason, the most durable material should be used to ensure long-term and trouble-free operation, thus avoiding extended downtime during maintenance or replacement. Inert recycled glass infill should be used to ensure long-term performance without the need for water protection. Typically, polyester films are used to protect the infill from water, significantly reduce the silencer's attenuation property. With better insertion loss, a shorter silencer may be required, leading to a lower pressure loss and cost reduction. Further, the polyester film may be easy to damage due to handling during installation, challenging to make a watertight seal, and has a limited life span. Recycle glass is resistant to water (retain its shape), UV, and heat and has good sound absorption properties. See the Performance Data section for sound insertion loss performance of our silencers with recycled glass infill. For more information on the silencer, refer to the submittal sheet SBXEP004.

The cooling tower intake silencer may be constructed of the same material as the discharge silencer if the interior is exposed to weather and cooling tower water overspray. If the intake silencer can be isolated from water, in that case, a significant cost saving can be had using our conventional silencer similar to our model HA40 silencer for indoor application except to paint the exterior with waterproof paint identical to the duct. As polyester films are not required, a shorter silencer may be selected leading to a pressure loss and cost reduction.

Please refer to Guide Specification below.

**Materials**

1. **Casing** – The silencer casing shall be made of 1.2 mm thick stainless-steel sheet SUS304/SUS316 (choose one) and accurately pre-punched with appropriate holes for assembly of splitters, flanges, and adjacent modules. According to the casing, the splitter frame, inlet, and outlet fairings shall be made of the same thickness stainless steel sheet.
2. **Perforated Lining** – Perforated linings shall be made of 0.8 mm thick SUS304/SUS316 (choose one) stainless steel sheet perforated with 3.0 mm diameter holes arranged in a 60-degree staggered pattern with 5 mm triangular pitches.
3. **Angle frame** – The angle frame and flange shall be made of SUS304/SUS316 (choose one) stainless steel sheet. For a single module silencer, the angle frame shall be made of 40mm x 40mm x 2.5 mm. For multiple module silencers, the angle frame shall be construction 50 mm x 50 mm x 5 mm thick angles.
4. **Infill** – Acoustic infill shall be constructed of recycled glass panels, a non-flammable, fiber-free absorber board made of ecologically harmless glass. The recycle glass shall be water-resistant and shall maintain its shape and thickness when wet. The use of fiberglass or mineral wool with polyester film protection is not acceptable.

**Construction**

The silencer shall be constructed of a casing, splitters, and connecting flanges. The casing shall have snap-lock corner joints angle-reinforced to give it strength. The joints shall be filled with silicone sealant to prevent air leakage to a minimum pressure of 2000 Pascals.

The splitter shall consist of a die-formed bullnose fairing, a stainless-steel frame constructed of cold-formed angles, perforated steel linings, and acoustic infilled. The perforated sheet lining shall be fastened to the splitter frame with 3.175 mm diameter stainless steel rivets; tack or spot welding shall not be allowed. These parts shall be assembled to form an aerodynamic shape splitter. When assembled within the casing, the splitters form bell mouth entrance and taper discharge for uni-direction airflow. The aerodynamic splitter design with selected infill and lining perforation shall meet the specified sound attenuation with less airflow resistance and lower generated noise.

Splitters shall be fastened to the casing with 4.75 mm diameter high-quality SUS304 rivets. No tack or spot welding shall be allowed.

**Performance**

The subcontractor shall submit the brand, the manufacturer name, the type of silencer, size, acoustic, and aerodynamic performance for approval. Test reports of each type of silencer shall be submitted for approval before ordering. The silencer should have been tested in an accredited laboratory for pressure loss, static and dynamic sound insertion loss (SIL and DIL), and generated noise in a duct-reverberation chamber according to ASTM standard E477-99. For the DIL, the silencer shall be tested with airflow in the forward and reverse direction in relation to the noise source.

The pressure loss across the silencer shall not exceed the values specified for each cooling tower in the silencer schedule.

The fan manufacturer shall submit accurate fan sound power levels for the silencer manufacturer to perform noise analysis to determine the dynamic insertion loss required to achieve the specified ambient noise level. Noise analysis and resultant silencer selection and pressure loss shall be submitted for approval before proceeding to manufacture. The fan manufacturer shall adjust the fan static to compensate for the selected silencer pressure loss.

The silencer shall be similar to OLSON Acoustics Model CT33 as manufactured by OLS Manufacturing Co. Pte Ltd or equivalent.