

Proposed HVAC layout:

- Two 10" x 14" supply ducts would extend from the opening, serving the left and right sides of the room.
- There would be a 36" x 12" Titus CT-350FL return grille in the middle, discreetly positioned on the back wall's high side, mostly hidden by the soffit.
- The supply would feature a 1" linear slot diffuser within the soffit, recessed off the wall to optimize space.
- The soffit's design is crucial; I'm exploring the option of a box shape at the highest height instead of an L shape, but I want to ensure it remains aesthetically pleasing.
- The linear diffuser, placed close to the glass, will throw air downwards. To maintain a continuous linear slot along the perimeter, some sections of the 1" slot would be faux, not emitting air.
- The linear diffuser lacks the capability for angling, as was previously suggested with a 15-degree off-vertical deflection. Our intention is to direct the air straight down to form an air curtain along the glass.
- For the right of the entrance door, a high side off the end of the soffit would supply air horizontally to the ceiling, effectively washing the glass door.
- Please ensure the outdoor unit/condenser is placed in the outdoor pool equipment area near the mechanical room, avoiding the garage roof, which is 150 feet away and violates the 50-foot maximum line set length requirement.

Another return option:

- A 2" single linear slot, 22 feet long, along the high side of the 24-foot back wall underneath the supply ducts.

Important considerations:

- Supply: Two ducts measuring 10" x 14", each delivering 500 cfm at a velocity of 600 ft/min.
- Return: A single duct handling 1,300 cfm at a velocity of 500 ft/min.
- Our objective is to maintain a noise level within the range of NC 20-22, with a preference for 20. A Noise Criteria (NC) correction table, factoring in length, is provided for reference.
- The specified exhaust fan is known for its quiet operation, crucial for continuous 24-hour use.
- Regarding health concerns related to chemical removal, the location of the return on the high or low side seems to have no significant impact.
- This proposed design addresses prior concerns related to preventing glass fogging, a consideration overlooked in the building mechanical designers' layout.
- Their plan involved a single 700 cfm return on the left side of the back wall and a 1050 cfm return fitted into the opening just to the right of the building mechanical ducts. (These directions are based on the perspective of looking at the back wall from the entrance.).
- Notably, they didn't specify a dehumidifier, only a forced air unit located in the mechanical room.

Observations:

- The entrance door, made by Vitrocsa, features a glass pivot design. The door swings inward, complying with regulations, as it is not subject to the typical requirement for outward-swinging doors mandated for outdoor pools with child safety concerns.
- The client desires a solution to prevent fogging on the dual-glazed tempered glass windows that make up all three walls and the entrance door, supplied by Skyframe. The proposed solution involves washing all the glass surfaces with 87°F supply air.
- The lack of a soffit where the entrance door is located obstructs the washing of high side supply air in this section of the front glass wall. This may potentially lead to fogging or stratification issues. Explore options for angling the airflow to ensure it washes over the door effectively.
- Can we maintain a 4" tall supply duct and still ensure sufficient airflow, given the limitation imposed by the soffit's maximum height?
- Dividing a supply air of 1,000 cfm into five 4" tall ducts, each providing 200 cfm, presents a challenge. To fit within the perimeter soffit, having five 14" x 4" ducts would exceed the width of the 57" opening.
- To address space constraints and facilitate return air, a potential solution involves mounting a low side return on the back concrete wall, measuring 36" x 12". This requires punching out the CMU block and installing a header.
- It's essential to specify the quietest 300 cfm exhaust fan to minimize noise.
- Exposed spiral ducting is not suitable for this project as the client desires a concealed appearance for aesthetic reasons.
- Ductwork within conditioned spaces generally doesn't require insulation. However, it is advisable to insulate the ducting in the mechanical room.