

# Project Slidell Athletic Club – Oak Harbor

## HVAC Calculations

### Total Building Envelope

The Btuh Gain for 2100 SF of SouthWest Shaded Double Pane Glass = 210000

The Btuh Gain for 16.7 SF of East and West Double Pane Glass = 1586.5

The Btuh Gain for 7380.3 SF of Steel Stud, R-13, 5/8" Gypsum = 16974.7

The Btuh Gain for 16875 SF of Metal Building Roof, R-19 = 87750

The Btuh Gain for 243 People = 2430

The Btuh Gain for 16875 SF of Area Lighting = 67500

The Btuh Gain for 10000 watts (Appliances) = 38000

**Fresh Air Calculations:** (per the 2009 IMC Section 403.3.1.1)

Weight Room: 6590 SF

$$V_{bz} = R_p P_z + R_a A_z = [20 \times ((6590/1000) \times 10)] + (0.06 \times 6590) = 1715$$

Physical Therapy: 1500 SF

$$V_{bz} = R_p P_z + R_a A_z = [15 \times ((1500/1000) \times 20)] = 450$$

Offices: 390 SF

$$V_{bz} = R_p P_z + R_a A_z = [5 \times ((390/1000) \times 5)] + (0.06 \times 390) = 33$$

Toilet Rooms: 12 Fixtures

$$V_{bz} = 12 \times 70 = 840$$

Rear Area: 1630 SF

$$V_{bz} = R_p P_z + R_a A_z = [20 \times ((1630/1000) \times 10)] + (0.06 \times 1630) = 425$$

Smoothie Shop: 1970 SF; 985 dining

$$V_{bz} = R_p P_z + R_a A_z = [7.5 \times ((985/1000) \times 70)] + (0.18 \times 985) = 700$$

Child Care: 530 SF

$$V_{bz} = R_p P_z + R_a A_z = [10 \times ((530/1000) \times 25)] + (0.18 \times 530) = 230$$

Women's Area: 1100 SF

$$V_{bz} = R_p P_z + R_a A_z = [20 \times ((1100/1000) \times 10)] + (0.06 \times 1100) = 290$$

Total Fresh Air Intake = 4683 CFM

The Btuh Gain for 4683 cfm OA = 210735

**Total Btuh Gain = 634976.2**

**Total Tons HVAC needed = 52.9**