

# Mayers & Assoc., Inc. - CONSULTING ENGINEERS

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**Mr. James Waite**, Review Architect  
Office of the State Fire Marshal

Re: RG Center, 1414 Gause Blvd., Slidell, la  
SFM P0337988

Mr. Waite,

In your review letter of March 12, 2008, you cited several requirements for an Area of Refuge in the stairwells. One of the requirements involved a supply fan to force a positive pressure in the stairwell in order to keep smoke from penetrating the stairwell. This is the first time I have designed a fan for this purpose, but I see the reasoning in the Codes and calculations and description are as follows:

NFPA 92A Table 5.2.1.1 requires a minimum positive pressure (from the stairwell to all adjacent spaces with connecting doors) to be at least 0.05" w.g. The stairs in all of the suites have 2 doors; one at ground level to the exterior of the building and a second door into the 2<sup>nd</sup> floor office suite. All 2<sup>nd</sup> story suites have basically the same stair layout in this strip office building.

The exterior of the building is the atmosphere and has zero pressure. The 2<sup>nd</sup> floor suite should have a negligible positive pressure induced by the HVAC system. When the HVAC fan is not running, the suite also has a zero pressure.

Leakage: 92A 5.3.6.1 states that doors to the stairwells must be self-closing. The walls must also be sealed and caulked. The only 'design leakage' will be around the doors, which should fairly tight.

I actually know of no reasonable method to determine leakage around the doors since the door cracks are not consistent; but consider the following: The ASHRAE Handbook stated in the past that a 1" undercut door space will flow 150 CFM of return air with a standard HVAC. In other words, if a door is closed and has a 1" undercut (1" x36" gap), 150 CFM can flow through that opening via the HVAC fan which has around 0.1" static pressure between the supply and return grilles.

Let us assume that the stair doors (UL Rated) have a 1/4" gap. This should be extreme and the slot/crack should be far less. We have two doors so we have 2 times the 1/4" gap or 1/2" x36" open area for air to escape from the stairwell. This is half of the ASHRAE 1" gap so we can propose that 75 CFM can escape from the two doors. Again this is very conservative. In actuality, it should be far less. In addition, let's double the air leakage as a safety factor and to account for cracks in the sheetrock floating, cracks around the door frames, etc. Still, 150 CFM is a conservative flow rate.

Thus we need a supply fan that will produce at least 0.05" pressure with 175 CFM air flowing. This will be a small supply fan such as a Penn FQ098LO, 1500 RPM, 1/28<sup>th</sup> HP, 120 volt or equal. The factory only rates this fan as 455 CFM at 0.0" static pressure and 355 CFM at 0.1" static pressure. Thus at 0.1" static pressure (double what NFPA requires) it will flow twice the proposed flow which is also has a large safety factor. Note that even though we have a higher pressure than required in the stairwell (0.1" is barely noticeable), the doors open outward and if anything, this will assist in opening the doors for the occupant which may be handicapped.

As fire and smoke rises, the lower the fan intake, the less chance of introducing smoke and fire. The fan should be mounted slightly over the exterior door and switched from the Area of Refuge. The fan shall have an automatic gravity louver (normally closed to keep insects out) with a weatherproof hood. The fan should have no smoke or temperature limit controls.

If you have any questions, please give me a call and thank you for your assistance.

Joe Mayers, PE

### PERFORMANCE DATA

FAN MODEL	RPM	TIP SPEED Ft/Min	HP	SONES @ .100" SP	CFM vs. STATIC PRESSURE										MAX BHP	FAN SHIP WT. Lbs.	DAMPER MODEL		
					.000"	.100"	.125"	.250"	.375"	.500"	.625"	.750"	.875"	1.000"					
FQ098LO	1500	3435	1/28	8	455	355													
FQ098HI	1650	3780	1/28	10	500	410	385									170	15	15	WAG WAG

# DAMMON ENGINEERING, INC.

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April 4, 2008

Office of State Fire Marshall  
Slidell, La  
Attn: Mr. Otis Ramke

Re: **RG Center**  
**PO337988**  
**Amended Review**

Dear Mr. Ramke,

Attached, please find a partial set of the drawings for the above project, revised and re-stamped. These drawings reflect our response and plan changes to the major items in the amended review letter, Items #2 thru #4 and #6 and #8.

Please contact me if I can further assist you with any of these items.

Sincerely,



Robert Wiltse

Chief Architect

Dammon Engineering, Inc.

Cc: Mr. Jim Luttrell

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