Educational Training Program for the FM 4991 Written Exams

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Purpose

Assist companies who want to become an FM Approved Firestop Contractor.

Provide potential DRIs with an idea what the test is like.

Improve the success rate for those who take the exam.
Basics - Ratings

We will discuss some basics that everyone should know but it seems that many people don’t.

Is it OK to over design the assembly?

Examples:

1) A 2 hour F rating is needed. Can I use an assembly that has a 3 hour F rating if everything else meets or exceeds the criteria?

2) Air leakage criteria is not a requirement. Can I select an assembly that has an air leakage rating if all else is OK?
Basics - Ratings

More examples:

3) A 2 hour T rating is needed. The assembly you want to use has a 1 hour T rating but a 3 hour F rating. Can it be used?

4) A head of wall joint requires a Class II movement rating of ±10% compression and extension. The design you’ve selected has Class II movement rating of ±15% compression and extension. Can it be used?

a) What is the assembly has a Class II movement rating of +10% compression but nothing is shown in the listing for extension? Can it be used?
Basics – Penetrations

More examples:

5) You need a 2 hour F rating. You have a 10 inch diameter opening with two (2) 2 inch diameter copper pipes passing through. The listing shows a max 10 inch diameter opening with a single max six (6) in diameter copper pipe passing through. Can we use it?

The pair of 2 inch pipes takes up less space than a single 6 inch diameter pipe so it must be OK to use right?
More items to consider:

a) If a listing shows multiple penetrations, you need to determine if fewer penetrants can be used.
b) If some penetrants are not present, does the rating change?
c) If all penetrants are present, does the rating change?
d) Check to see if insulation is required or optional. It might be required on some and optional on others. If not provided, it may change the rating.
e) Check min/max clearances, concentric or eccentric penetrants, penetrant contacts the opening (point contact).
More items to consider:

a) If a listing requires a minimum 6 inch thick concrete floor and your situation has a 5 inch thick concrete slab, is it OK to use it?

b) What if a listing requires a minimum 5 inch thick concrete floor and your situation has a 6 inch thick concrete slab, is it OK to use it?

c) What if a listing shows a 5 inch thick concrete floor that incorporates a steel deck and your situation has a 6 inch thick concrete slab (w/o a steel deck). Since you exceed the minimum 5 inch concrete thickness, is it OK to use it?
Basics – The Fine Print

More items to consider:

a) Make sure you read the entire listing. They often contain ifs, ands, or buts if a feature is or is not present that can have an adverse effect whether the system can be used - or maybe reduces the rating.

b) The listing may show a floor assembly but also allow for a wall assembly (C-AJ). There is usually a note somewhere that says that the sealant/caulking/device must be placed on both sides if installing in a wall.
Examples of Listings – The Fine Print

Assembly Rating - 4 Hr

L Rating At Ambient - Less Than 1 CFM/Line ft

L Rating At 400 F - Less Than 1 CFM/Line ft

Nominal Joint Width - 2 in.

Class II Movement Capabilities - 12.5% Compression or Extension
Examples of Listings – The Fine Print

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete.

2. **Joint System** — Max width of joint (at time of installation of joint system) is 1 in. The joint system is designed to accommodate a max 25 percent compression or extension from its installed width. The joint system shall consist of the following:
Examples of Listings – The Fine Print

Some or all of the above penetrants may be incorporated into the opening. The hourly rating of the system is dependent on the selected penetrant as described in the table below:

<table>
<thead>
<tr>
<th>Penetrant</th>
<th>Hourly Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item #2a</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Item #2b</td>
<td>2</td>
</tr>
<tr>
<td>Item #2c</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Item #2d</td>
<td>1/2</td>
</tr>
<tr>
<td>Item #2e</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Item #2f</td>
<td>1</td>
</tr>
</tbody>
</table>
General Information Exam

True/false and multiple choice questions

Questions taken from FCIA MOP or FM Approval Standard 4991

May deal with material types, ratings, Approval Standard requirements.

Multiple choice may have answers like a, b, neither a or b, or both a and b.

Closed book – 45 minutes to complete.
General Information Exam

• T or F?

1) All firestop systems have been tested for an “L” rating?

2) Mortars and grouts are excellent materials to use when firestopping constructions joints because flexibility is not an issue?

3) In perimeter edge systems, the fiber orientation of the mineral wool does not need to be installed as shown in the listing?

4) Your crew calls in and states that the conditions they have encountered on the current project look exactly like the EFRA they installed on a previous but different project. You direct your crew to install the system you used on the previous project because that EFFRA is good for all projects your firm works on for the next seven (7) years
General Information Exam

What is the correct answer?

The FCIA Manual of Practice feels that a preconstruction meeting between all parties involved in the firestopping process is

a) essential
b) not worth the effort
c) needed only if the architect thinks it’s a good idea
d) none of the above
General Information Exam

What is the correct answer?

You are an FM Approved Firestop Contractor. Your project’s specifications state that all firestopping shall be labeled in accordance with Approval Std 4991 requirements. You have selected (and had approved) a design from the UL directory. The firestop was installed correctly. The label that you apply for this opening must contain which of the following?

a) wording that this assembly has not been fire tested
b) the UL logo
c) the FM Approval mark
d) a label does not need to be applied in this case
Design Selection Exam

Consists of 5 problems, each with 5 questions.

Answers are multiple choice.

No books allowed – you have 2 hrs to complete.

Problems consist of a description of a situation.

You don’t have to remember individual listings by memory. Copies of the listings referenced in the problem are provided to you.
Example No. 1

The concrete wall is 5 inches thick. The assembly rating needed is two (2) hours. The joint width is 2 inches. The specifications call for a system that has Class II movement capabilities of 15% compression or extension. No air leakage requirements have been specified. Which system(s) meet this criteria?

Reference Designs: FF-D-1006 FF-S-1016 FF-S-1027

a) FF-S-1016 only  
b) FF-S-1027 only  
c) FF-D-1006 only  
d) FF-S-1027 or FF-D-1006 can be selected  
e) None of the configurations shown above can be used.

The correct answer is e) None of the above  Why?
Example No. 2

The concrete floor and wall are each 4-1/2 inches thick. The F rating needed is one (1) hour. The joint width is 2 inches. The specifications call for a system that has Class II movement capabilities of 10% compression. No air leakage requirements have been specified. Which system(s) meet this criteria?

Reference Designs: FW-D-0009  FW-D-1004  FW-D-1029

a) FW-D-0009 only
b) FW-D-1004 only
c) FW-D-1004 or FW-D-1029 can be selected
d) FW-D-0009, FW-D-1004 or FW-D-1029 can be selected
e) None of the configurations shown above can be used.

The correct answer is c) Either FW-D-1004 or FW-D-1029 can be used? Why?
Example No. 3

The concrete floor is 4-1/2 inches thick. The F rating needed is one (1) hour. The joint width is 2 inches. The specifications call for a system that has Class II movement capabilities of 10% compression. No air leakage requirements have been specified. Which system(s) meet this criteria?

Reference Designs:    FW-D-0009    FW-D-1004    FW-D-1029

a) FW-D-0009 only  
b) FW-D-1004 only  
c) FW-D-1004 or FW-D-1029 can be selected  
d) FW-D-0009, FW-D-1004 or FW-D-1029 can be selected  
e) None of the configurations shown above can be used.

The correct answer is e) None of the configurations can be used? Why?
Example No. 4
FM Firestop Design No. 430
F-Rating = ½, 1, 1-1/2 and 2 Hrs
T-Rating = 0 Hrs
FM Firestop Design No. 430 (cont’d)

Assume you have encountered a situation where you can use FM Design No. 430. All items meet the annular space requirements and/or distance between penetrants. All firestopping has been properly installed.

1) If the only penetrant is a 4 inch nominal diameter PVC plastic pipe, what is the hourly F rating of the assembly?

2) If the only penetrant is a 2 inch nominal diameter TEK cable, what is the hourly F rating of the assembly?

3) If the penetrants consist of a 4 inch nominal diameter PVC pipe and a 2 inch nominal diameter TEK cable, what is the hourly F rating of the assembly? What is the T rating of the assembly?
4) If the penetrants consist of a 4 inch nominal diameter PVC pipe, a 2 inch nominal diameter TEK cable and an 8 inch nominal diameter schedule 40 steel pipe with 1-1/2 inch glass fiber insulation, what is the hourly F rating of the assembly?

5) If the penetrants consist of a 4 inch nominal diameter PVC pipe, a 2 inch nominal diameter TEK cable and an uninsulated 8 inch nominal diameter schedule 40 steel pipe, what is the hourly F rating of the assembly?

6) If the penetrants consist of two (2) 8 inch nominal diameter schedule 40 steel pipes each with 1-1/2 inch glass fiber insulation, what is the hourly F rating of the assembly?
Example No. 5

The concrete floor slab is 3 inches thick. The F rating needed is one (1) hour. The penetrant is a nominal 8 inch diameter Schedule 40 solid core PVC pipe used as a vented piping system. The opening is 12 inches in diameter. Which of the following configurations are acceptable to use in this situation?

Reference Design: F-A-2059

a) Configuration B only
b) Configuration C only
c) Configurations B, C and G can be selected
d) Configuration A only
e) None of the answers shown above is correct.

The correct answer is d) Configuration A can be used. Why?
Hints for Taking an Exam

• Get a good night’s sleep the night before.
• Read each problem carefully.
• Watch for words like always, all, none, never.
• You can answer the questions in any order you want.
• You can write on the tests.
• There’s no penalty for guessing so make sure you answer every question.
• If you have time, check your work!
The End

Questions?