



6 MAY 2016

File No. DOIA 1516-1271

Mr Geoff Merryweather
fyi-request-3884-c14037bb@requests.fyi.org.nz

Dear Geoff

Thank you for your email of 11 April 2016, requesting under the Official Information Act 1982 the following information:

I note that the FAQ on fire <http://www.building.govt.nz/building-code-compliance/c-protection-from-fire/c-clauses-c1-c6/protection-from-fire-faqs/> has called for different radiation

- 1. Please provide any justification used for these values or the justification for differing values between fuel load energy densities. Include any journal or other research references, supporting calculations, risk assessments and probability analysis and any incident reports of fire spread between sprinkled buildings forming the basis of this change.*
- 2. Please confirm what is the legal status of the FAQ in relation to the Building Act, and under which clauses in Building Act is it issued.*
- 3. Given this is a significant change to the design of buildings, which was not announced, what is time at which it is to take effect and what is the status of projects in design or consent processing at the time of the change.*

I respond to each of your questions below.

1. Enclosed is correspondence received from Dr Charles Fleischmann from the University of Canterbury that provides justification for the values.
2. The FAQ's are published under section 175 of the Building Act 2004, to provide guidance or intent of the requirements within the Acceptable Solutions or Verification Method for Protection from Fire. FAQ's are provided to assist designers with interpretation of the compliance documents
3. FAQ's are published as guidance and do not alter the Acceptable Solutions or Verification Method for Protection from Fire. BCA's can choose whether or not to accept this guidance as part of a building consent submission however they are non-mandatory. The time when the guidance is issued is not relevant.

Yours sincerely

Larry Bellamy
Manager Engineering Design and Science
Building System Performance

I have been looking at this again and trying to somewhat jog my memory. To be consistent with the double the radiator area used in the AS documents, the scaling factor on the unsprinklered heat flux (Q) would be more like 70% than 50% as done PD7974. There is nothing technical to justify 70% rather than 50% it is just more consistent with the double the area approach that has been done historically. The 70% is a simplification because it is actually dependent on the height to width ratio and how you double the area of the radiator. Typically in method 2, people have a tendency to double the width of the radiator rather than scaling both width and height by the square root of 2 to double the area of the radiator. If I plot height to width ratio verses the $Q/Q(AS)$ where Q is the heat flux for a sprinklered building based on doubling the area and $Q(AS)$ is the heat flux according to AS for unsprinklered fire you can see the scaling factor ranges from 60 to 95% of the unsprinklered value depending on the how the double area is calculated and what the width to height ratio is.



Bottomline there is no technical basis for the double radiator area increase for sprinklers nor the 50% reduction in radiation for sprinklers as in PD7974. The only problem I see with going to the 50% reduction in heat flux for sprinklers is that it will not be consistent with the approach taken in method 2 or what is in the AS documents. If you take the 50% approach someone will quickly notice the inconsistency and the AS documents would need to come in line with the VM values. Path of least resistance would be to use 70% reduction applied to all three heat flux levels given in method 1 when sprinklers are installed.

Rereading the clause in VM2 I now see where the confusion is. I agree with your change. The reduction was not intended for storage over 3m. If the 70% factor was allowed across all sprinklered buildings it would make things easier.