APPEAL FORM

Questions for this promotional examination were taken solely from the source material listed in the Source Material List. Information contained in any other material will not be considered in determining the correct answer to any question.

Houston Fire Department HFD Investigator 1/7/2015

You may only appeal **ONE** question per form.

For Question # 8 I would like the Test Review Committee to take the following action (please check one or explain in the space provided):

( ) Make A the only correct answer.
~~( ) Make B the only correct answer.~~
( ) Make C the only correct answer.
(✓) Consider the following as correct answers (circle the answers you feel are correct):

(A) (B) C

( ) Give all applicants credit
( ) Remove the question from the exam.

( ) Other (please explain below):

Explanation: Please provide a detailed explanation of your appeal / rebuttal. **DO NOT WRITE THE TEST QUESTION ON THIS FORM.** Print/ Write legibly.

ALTHOUGH THE TEXT STATES THAT CERTAIN ELEMENTS "MAY" AUTO IGNITE, IT DOES NOT CLARIFY WHAT CONTRIBUTES TO IGNITION. HFD GUIDELINES STATE THAT THERE IS A DIFFERENCE BETWEEN MAY, SHALL, WILL, ~~[illegible]~~ ETC.

ANSWER "A" [redacted] RANGE FROM 626° to 707° THIS IS BARELY OVER THE 700° TEMPERATURE ASKED IN THE QUESTION

HOWEVER, ZIRCONIUM HAS A MELTING TEMPERATURE THAT IS 3,371° AND ITS IGNITION TEMPERATURE IS IN EXCESS OF THAT.

THE QUESTION ASKED WHICH IS "MOST LIKELY" HIGHER THAN 700°. THAT WOULD CLEARLY BE A METAL THAT DOESN'T EVEN START MELTING UNTIL ABOVE 3,000°

7071820
Random Test Number

1/27/2015
DATE

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☐ Approved ☐ Denied

Committee Chairman Signature ____________

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~~( ) Make B the only correct answer.~~

( ) Make C the only correct answer.

( ) Consider the following as correct answers (circle the answers you feel are correct):

A B C

(X) Give all applicants credit

(X) Remove the question from the exam.

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The way the question is worded is highly confusing and very open to read interpretation. On page 33, table 3-4 is referred to in the paragraph referencing it to "selected ignition temperatures. Wood is listed as 1880°F. On page 35, wood hard is given an ignition temperature of 626°F – 707°F, a 81°F range Non-fire rated plastic is given a range of 518 – 680° and overall solids a range of 518 – 842°F. In theory, all of the above fall into the realm of having a higher ignition temp due to the principle of lab tests vs real world situations, as page 144 in Fire Investigation book brings out. Real world is commonly higher ignition temp's than lab. testing. Using that thought process, both A and C fall within that range. Adding in the factor of Bloom's Taxonomy and trying to interpret the material and understand it, the question is highly confusing. Zirconium is a metal and is flammable. One could assume that if A + C answers are similar, that by process of elimination that "B" is the correct answer. Zirconium would also fit under the Solid Range Fuel ignition temp

And, on page 46, the ignition ~~for~~ temp. for ~~[illegible]~~ thermoplastics is listed as high as 750°F when it melts and flows.

With the very minor difference's in listed temps on page 35, and the way the question is worded, I feel it should be thrown out ~~or~~ give all applicants credit. Had it been worded differently or more specific it would not have caused so many issues

1693470

Random Test Number

01/16/15

DATE

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☐ Approved ☐ Denied

Committee Chairman Signature ____________

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Houston Fire Department HFD Investigator 1/7/2015

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( ) Make A the only correct answer.

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( ) Make C the only correct answer.

( ) Consider the following as correct answers (circle the answers you feel are correct):

A B C

( ) Give all applicants credit

(X) Remove the question from the exam.

( ) Other (please explain below):

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See Highlighted areas of photo copy attached.

at the top of the page "Wood" has "its normal ignition temperature of 482°F."

This States "Wood" Will ighnigte Based on its "ignition temp" less than 700.°

Further "Wood-based Products" are the products refrenced with a temperature range ending above 700.°

"Wood" which is an answer choice has an ignition temp of 482°F

"Wood-based products" Which is NOT a choice is the Only items that are ranged UPTO 707.°

The Correct answer is not availabe and the question is INVALID

20929206

Random Test Number

1-9-2015

DATE

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☐ Approved ☐ Denied

Committee Chairman Signature ____________

points of the "star" in the center of the figure show situations in which just one condition is not met and ignition does not occur.

The typical situations in which an investigator is likely to encounter spontaneous heating fires involve commercial clothes dryers with oily laundry, painting operations, and piles of vegetable materials such as cotton bales or haystacks. Wood, like other cellulosic material, is subject to self-heating when exposed to elevated temperatures that are below its normal ignition temperature of 482°F (250°C). The scientific community has not reached a consensus on the self-ignition of wood. Charcoal briquettes have been suspected of self-heating to ignition; however, laboratory testing has shown that the common size of briquettes has not reached sufficient temperatures to self-ignite.

Certain elements may spontaneously ignite when exposed to air. White phosphorus, sodium, potassium, and some finely divided metals such as zirconium may react in this manner. Such elements are known as pyrophoric materials.

Oxidizer Fires

A material that is not combustible but can increase the rate of combustion or produce spontaneous combustion when combined with other substances is considered to be an oxidizing agent. Commonly found oxidizers include chlorine tablets for swimming pools and certain fertilizers that may begin to self-heat when combined with organic materials such as hydraulic fluids.

Transition to Flaming Combustion

When sufficient heat and vapors are created, smoldering materials may produce flaming combustion when a piloted ignition source is introduced. The amount of time required for this transition is difficult to predict and depends on numerous factors.

When the ignition source for flaming combustion is a smoldering material such as a cigarette, a long period of time may elapse before the first flames are observed. This smoldering heat can also begin heating the fuel and accelerating the initiation of flaming combustion. In other words, a "slow smoldering fire" may burn quite rapidly once the transition occurs. Therefore, it is not valid to eliminate a smoldering ignition source because a fire is perceived to burn rapidly after its discovery.

Piloted Flaming Ignition of Solid Fuels

To create flaming combustion of a solid fuel item, heat must be applied to the fuel to generate flammable vapors through either pyrolysis or vaporization. These vapors are then ignited by a piloted ignition source such as an arc, spark, or flame once their ignition temperature is reached.

The ignition temperature is an engineering approximation, but in general, the temperature of ignition of solids ranges from 518°F to 842°F (270°C to 466°C). Ignition temperatures for non-fire-retarded plastic range from 518°F to 680°F (270°C to 360°C), and wood-based products range from 626°F to 707°F (330°C to 375°C).

Additionally, unlike smoldering fires (which require only a minimum radiant flux of approximately 7 to 8 kW/m^2), piloted ignition requires critical radiant heat flux near 10 to 15 kW/m^2 to sustain flaming combustion. Experiments to determine the minimum heat flux depend on the duration of the testing. Piloted ignition has been observed in some cases after about one hour of radiant heating.

Finally, the thickness of the material will also play a role in the ignition of the fuel. Items that are thicker are generally more difficult to ignite than thinner ones. Further, thinner fuels such as papers and thin wood pieces or shavings allow for the heating of more than one side, reducing the time required to ignite the fuel item.

Flame Spread

As a fire grows, flames begin to move across the surface of the fuel at varying rates. These rates of flame spread are dependent on not only the individual fuel properties, but also on the position and orientation of the fuel surfaces. On vertical surfaces, concurrent flame spread is upward, and counterflow flame spread is downward.

On liquids, flame spread is dependent on the temperature of the liquid in relation to its flash point. If the liquid is below its flash point, flames spread across the surface through liquid flow. When the liquid is above the flash point, flame spread is the result of the ignition of gases.

For flames to move across the surface of a solid fuel, the material must be heated to produce fuel gases that ignite and facilitate the flame spread similar to that of the ignition process. Rates of flame spread depend on both concurrent and counterflow flame spread as well as the particular properties of the fuel (thickness, thermal inertia). The counterflow flame spread on thin fuels occurs for downward flame spread. The flame attaches from both sides, with the burning region being fairly short. With thick fuels, the counterflow flame spread normally is downward on a wall or horizontal on an upward-facing horizontal surface. Concurrent flame spread on thin fuels occurs from upward flames and often attaches itself to both sides of the fuel. With thick fuels, the concurrent flame spread is normally for upward flame spread on walls and the underside of combustible surfaces.

Role of Melting and Dripping in Flame Spread

Flame spread may also be the result of melting or dripping materials from a fuel package. When a material melts, it flows with gravity, usually collecting on a horizontal surface below the object. This flow can allow the flames to spread away from the burning fuel, igniting other portions of the burning fuel, or spread to other fuel packages not currently on fire. This may limit the ability of the flame front to spread across the surface of the fuel package. Fire spread may also be accelerated when certain fuels begin to melt and pool. For example, when urethane foams burn, such as a cushion on a recliner, pools of burning liquid are created on the floor underneath the recliner and increase the rate of flame spread.

Role of External Heating on Flame Spread

The rate of flame spread of a given fuel package may also be accelerated when radiant heat produced by other burning objects as well as radiant heat from the upper gas layers of a compartment fire impact the given fuel package.