

PROCESS FOR PRODUCING EXTINGUISHING AGENT AND THROW-TYPE FIRE EXTINGUISHER

FIELD OF INVENTION

The present invention relates to a process for producing extinguishing agent and ampoule that is similar to a throw type or a handy fire extinguisher.

DESCRIPTION

A liquefied extinguishing agent is made up of various compositions. For example, Japanese Patent Laid-Open Publication No. 2001-37901 discloses an extinguishing agent comprising urea, sodium chloride, sodium carbonic anhydride, ammonium sulfate and the like.

However, amongst processes for producing an extinguishing agent, many of them do not disclose the detail of production as know-how of venders. A process for producing a distinguishing agent will be disclosed herein.

In recent years, in addition to a floor type fire extinguisher, a throwing type fire extinguisher has been commercialized, which is thrown to the origin of a fire. Since it is sometimes difficult to use the floor type fire extinguisher in the course of the actual action of extinguishing a fire, a throwing type fire extinguisher, which can extinguish a fire only by throwing it at the origin of a fire, may be considered to have easiness and convince of application.

However, all of components making up the fire extinguishing agent are not necessarily safe, and there is a possibility to cause a problem when a child or an aged person drinks it by mistake.

Accordingly, there is a need for a process for producing a safe extinguishing agent, which has no or little adverse influence on human body.

Furthermore, there is a need for providing a process for producing a safe extinguishing agent, which effectively conducts a treatment so that components incorporated therein may exhibit their action, to thereby produce an extinguishing agent having a high fire-extinguishing performance.

SUMMARY OF THE INVENTION

According to the present invention, there is provided a process for producing a liquefied extinguishing agent (2) comprising

- a step of incorporating sodium chloride in an amount of 5g to 15g and ammonium dihydrogen phosphate in an amount of 50g to 70g both relative to 500ml of water at a temperature of 30°C to 40°C to solve them into the hot water, and
- a step of incorporating sodium hydrogen carbonate in an amount of 50g to 70g relative to 500ml of water into the solution to be dissolved therein.

The process of the invention may further comprise a step of incorporating a surfactant.

According to another aspect of the present invention, there is a process for producing an extinguishing agent comprising

- a step of incorporating sodium chloride in an amount of 5g to 15g and ammonium dihydrogen phosphate in an amount of 50g to 70g both relative to 500ml of water at a temperature of 30°C to 40°C to solve them into the hot water,
- a step of incorporating sodium hydrogen carbonate in an amount of 45g to 70g relative to 500ml of water into the solution to be dissolved therein,
- a step of incorporating urea in an amount of 20g to 40g relative to 500ml of water into the solution to be dissolved therein, and
- a step of incorporating ammonium sulfate in an amount of 35g to 55g relative to 500ml of water to be dissolved therein.

The process according to another of the invention may further comprise a step of incorporating a surfactant.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

First Embodiment

First embodiment of the present invention will now be described.

First, 5g to 15g, e.g. 10g of sodium chloride is incorporated in an appropriate amount of water at a temperature ranging from 30°C to 40°C, for example, approximately, 40°C, and then the mixture is stirred to dissolve sodium chloride into water. Sodium chloride is utilized as a catalyst.

Subsequently, 50g to 70g, for example, 60g of ammonium dihydrogen phosphate is incorporated and dissolved therein, and 50g to 70g, for example, 60g of ammonium hydrogen carbonate is incorporated to cause a reaction to be dissolved.

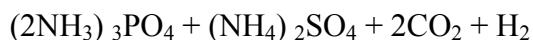
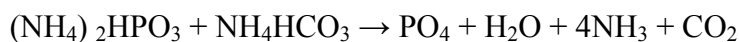
Ammonium dihydrogen phosphate and ammonium hydrogen carbonate are thermally decomposed into carbon dioxide gas (CO_2) and ammonia gas (NH_3) during the course of fire extinguishing through combustion. Carbon dioxide gas has a function of shielding the supply of oxygen to burning products and a function of neutralizing and suppressing oxidation of burning products. Ammonia gas, which possesses a neutralization function and a cooling function, prevents re-ignition of burning products to avoid spreading fire to circumferences.

Subsequently, an appropriate amount of boiling water is added to the solution.

Next, water is added to total amount of extinguishing agent to be 500ml.

Finally, as occasion may demand, effective amount, e.g. approximately 20ml of a surfactant (e.g. alpha foam: surfactant for forming aqueous membrane foam) is added to 500ml of the extinguishing agent.

Reactions brought about by combustion in the course of extinguishing fire are as follows:



The extinguishing agent thus produced is incorporated into a container to be ready for use. The container in which the extinguishing agent of the present invention is incorporated may be various kind of containers which can store the extinguishing agent of the present invention without deterioration of quality of the extinguishing agent of the present invention in a stable manner and which are not collided with the extinguishing agent of the present invention.

Second Embodiment

Next, a second embodiment of the present invention will be described.

First, 5g to 15g, for example, 10g of sodium chloride is incorporated in an appropriate amount of water at 30°C, and then the mixture is stirred to dissolve sodium chloride into water. Sodium chloride is utilized as a catalyst.

Subsequently, 50g to 70g, for example, 50g of ammonium dihydrogen phosphate is incorporated and dissolved therein, and 45g to 70g, for example, 45g of ammonium hydrogen carbonate is incorporated to cause a reaction to be dissolved.

Subsequently, boiling water is added to the resulting solution.

Ammonium dihydrogen phosphate and ammonium hydrogen carbonate are thermally decomposed into carbon dioxide gas and ammonia gas during the course of fire extinguishing through combustion. Carbon dioxide gas function of shutting the supply of oxygen to burning products and neutralizing and suppressing oxidation of burning products. Ammonia gas, which possesses a neutralization function and a cooling function, prevents reignition of burning products to avoid spreading fire to circumferences.

Subsequently, 20g to 40g, for example, 20g of urea is incorporated and dissolved in the solution. Thereafter, 35g to 55g, for example, 45g of ammonium sulfate and an appropriate amount of boiling water are incorporated to dissolve ammonium sulfate.

Next, water is added to total amount of extinguishing agent to be 500ml.

Urea is also thermally decomposed into carbon dioxide gas and ammonia gas by combustion in the course of extinguishing a fire. Due to a function of oxygen-shielding to the burning products possessed by carbon dioxide gas and functions of neutralization and cooling possessed by ammonia gas, burning products can be extinguished and spreading of fire to circumferences can be prevented.

Finally, as occasion may demand, 20ml of a surfactant (e.g., alpha foam) is added to 500ml of the extinguishing agent.

The extinguishing agent thus produced is incorporated in a container to be ready for use. The container in which the extinguishing agent of the present invention is incorporated may be various kind of containers which can store the extinguishing agent of the present invention without deterioration of quality of the extinguishing agent of the present invention in a stable manner and which are not collided with the extinguishing agent of the present invention. Examples of the containers which can be used, include but are not restricted to metal-made containers, resin-made containers having a light weight.

According to the first and second embodiments of the process for producing an extinguishing agent of the present invention, a safety extinguishing agent having no or little influence upon human body can be provided. The use of ammonium hydrogen sulfate increases extinguishing rate.

The extinguishing rate when the conventional ammonium carbonate is used and that when ammonium hydrogen carbonate is used are shown below.

Table 1

	Rate
Ammonium carbonate	45 seconds
Ammonium hydrogen carbonate	25 seconds

When being incorporated into an appropriate container, the extinguishing agent produced according to the present invention can be used for a fire extinguisher which is thrown at the origin of a fire when fire occurs. A safety extinguishing agent having no or little influence upon human body can be provided. The use of ammonium hydrogen sulfate increases extinguishing rate.

Description of the Ampoule

The liquefied extinguishing agent (2) is packed in a thin-walled synthetic resin container (1) (an ampoule) having such a size that one can hold and throw. The container is filled with the above-described extinguishing agent and sealed with a silicon or rubber cap (3). The temperature range of the use of the resin container is from -15°C ~ 80°C and it could be kept for more than 7 years in a safe-keeping environment or in room temperature (-10°C ~ 45°C). The resin container would bear external pressure up to 75kg, but it would break if it is thrown from a height of about 30cm. The ampoule also withstands an internal pressure of 0.06mpa for 5 minutes. When the ampoule is thrown into the origin of a fire, the ampoule would break, and the diffused extinguishing agent would cause a chemical reaction by the heat of the burnt material and thus quench fire simultaneously.

The design of the thin-walled round cylinder (ampoule) is shown in FIG. 1. The material of the resin container is made of non-phthalic acid, high-pressure polyvinyl chloride (PVC), low-pressure polyvinyl chloride, polypropylene, or the like.

The container is designed to provide a barrier-free extinguishing environment to children, senior citizens, the disabled and women in particular. With this ampoule, anybody can hold and throw it without complicated operation when confront with an unexpected fire. This design is especially practical and effective in the case of

emergency and most importantly, the breakable resin does not hurt our skin, so it is safe to use by everybody to quench fire.

CLAIMS:

- [1] A process for producing a liquefied extinguishing agent (2) comprising
- a step of incorporating sodium chloride in an amount of 5g to 15g and ammonium dihydrogen phosphate in an amount of 50g to 70g both relative to 500ml of water into hot water at a temperature of 30°C to 40°C to solve them into the hot water, and
 - a step of incorporating sodium hydrogen carbonate in an amount of 50g to 70g relative to 500ml of water into the solution to be dissolved therein.
- [2] The process according to Claim 1, which further comprises a step of incorporating an effective amount of a surfactant.
- [3] The process according to Claim 2, wherein said surfactant containing a fluorine-type surfactant for forming an aqueous membrane foam.
- [4] The process according to Claim 1, wherein said liquefied extinguishing agent (2) is incorporated in a resin container (1) to be ready for use as a throwing type fire extinguisher.
- [5] The process according to Claim 1, wherein after all of the components are dissolved in hot water, water is added to the final volume.
- [6] A process for producing a liquefied extinguishing agent (2) comprising
- a step of incorporating sodium chloride in an amount of 5 to 15g and ammonium dihydrogen phosphate in an amount of 50g to 70g both relative to 500ml of water into hot water at a temperature of 30°C to 40°C to solve them into the hot water,
 - a step of incorporating sodium hydrogen carbonate in an amount of 45g to 70g relative to 500ml of water into the solution to be dissolved therein,
 - a step of incorporating urea in an amount of 20g to 40g relative to 500ml of water into the solution to be dissolved therein, and
 - a step of incorporating ammonium sulfate in an amount of 35g to 55g

relative to 500ml of water to be dissolved therein.

- [7] The process according to Claim 6, which further comprises a step of incorporating a surfactant.
- [8] The process according to Claim 7, wherein said surfactant containing a fluorine-type surfactant for forming an aqueous membrane foam.
- [9] The process according to Claim 6, wherein said liquefied extinguishing agent (2) is incorporated in a resin container (1) to be ready for use as a throwing type fire extinguisher.
- [10] The process according to Claim 7, wherein an appropriate amount of boiling water is added to the solution, before urea is incorporated in the solution.
- [11] The extinguishing agent is packed in a thin-walled synthetic resin container (1) (an ampoule) having such a size that one can hold and throw easily. Such container is filled with the above-described extinguishing agent and sealed with a silicon or rubber cap (3). The temperature range of the use is from -15°C~80°C and it could be kept for more than 7 years in a safe-keeping environment or in room temperature (-10°C~45°C). The resin container (1) would bear external pressure up to 75kg, but it would break if it is thrown from a height of about 30cm. The ampoule also withstands an internal pressure of 0.06mpa for 5 minutes. When the ampoule is thrown into the origin of a fire, the ampoule would break, and the diffused liquefied extinguishing agent (2) would cause a chemical reaction by the heat of the burnt material and thus quench fire simultaneously.
- [12] The device of claim 11 characterised in that the design of the thin-walled round cylinder (ampoule) is shown in FIG. 1. The material of the resin container (1) is made of non-phthalic acid, high-pressure polyvinyl chloride (PVC), low-pressure polyvinyl chloride, polypropylene, or the like.