What is claimed is:

1. A mist generating device comprising: a first fluid passage having a first fluid inlet and a first fluid outlet disposed about a longitudinal axis of the device; and a second fluid passage having a second fluid inlet and a second fluid outlet through which a second fluid passes, the second fluid passage disposed about the longitudinal axis concentric with the first fluid passage, the second fluid passage defining an equivalent angle of expansion of between 1 and 40 degrees;

wherein the second fluid passage includes a throat portion located between the second fluid inlet and the second fluid outlet, the throat portion having a smaller cross sectional area than that of either the second fluid inlet or second fluid outlet such that the area ratio between the throat portion and the second fluid outlet is between 5:7 and 2:11; and

wherein the ratio of the cross sectional area of the first fluid outlet to the second fluid outlet is between 10:3 and 1:12.

2. The device of claim 1, wherein the cross sectional area of the second fluid outlet is between 4 and 7 times greater than that of the first fluid outlet.

3. The device of either preceding claim, wherein the first fluid passage surrounds the second fluid passage, and the first and second fluid outlets

are oriented relative to one another such that they have an angle of incidence of less than 90 degrees.

4. The device of claim 3, wherein the first and second fluid outlets are oriented relative to one another such that they have an angle of incidence of between 5 and 30 degrees.

5. The device of any preceding claim, wherein the first fluid passage is located radially outward from the second fluid passage.

6. The device of any preceding claim, wherein the first fluid passage includes an intermediate portion located between the first fluid inlet and the first fluid outlet, the intermediate portion having a cross sectional area which is larger than that of either the first fluid inlet or the first fluid outlet.

7. The device of claim 6, wherein the intermediate portion of the first fluid passage has a cross sectional area which is between 50 and 400 times greater than that of the first fluid outlet.

8. The device of any preceding claim, wherein the first fluid passage defines a smooth curving profile that converges toward the longitudinal axis such that a flow path decreases in a direction from the first fluid inlet to the first fluid outlet.

9. The device of any preceding claim, wherein the first fluid passage defines a total volume of between 119000 mm^3 and 121500 mm^3 and the second fluid passage defines a total volume of between 24300 mm^3 and 25500 mm^3.

10. The device of any preceding claim, further comprising:

a first fluid supply channel having a first end adapted to be connected to a supply of a first fluid and a second end connected to the first fluid inlet; and

a second fluid supply channel having a first end adapted to be connected to a supply of a second fluid and a second end connected to the second fluid inlet;

wherein the first and second supply channels are substantially parallel to the longitudinal axis of the device.

11. The device of any preceding claim further comprising a chamber in communication with the first and second fluid outlets for mixture of the liquid and gas discharge so as to form the mist.

12. A method of mist fire protection for fixed equipment within a substantially enclosed space having a ceiling, a plurality of walls so as to

define a plurality of corners and an enclosure volume of at least 130 cu. m. (4590 cu. ft.), the method comprising:

disposing at least one mist generating device in the substantially enclosed space, the mist generating device comprising: a first fluid passage having a first fluid inlet and a first fluid outlet disposed about a longitudinal axis of the device; and a second fluid passage having a second fluid inlet and a second fluid outlet through which a second fluid passes, the second fluid passage disposed about the longitudinal axis concentric with the first fluid passage, wherein the ratio of the cross sectional area of the first fluid outlet to the second fluid outlet is between 10:3 and 1:12, the disposing at least one mist generating device consisting of one of:

(i) mounting at least two mist generating devices in the enclosed space, wherein the at least 130 cu. m. (4590 cu. ft.) (4590 cu. ft.) is at least 260 cu. m. (9180 cu. ft.), the at least two mist generating devices being disposed in diagonally opposed corners so as to define a minimum spacing therebetween of about 3.4 m. (11 ft.);

(ii) mounting the at least one mist generating device in a pendent configuration where the enclosure height ranges between about 3.0 m. (9.8 ft.) to about 8.0 m. (26.2 ft.) with a clearance from any wall of the enclosed space ranging from 0.3 m (1 ft.) to about 3.4 m. (11 ft.),

(iii) mounting the at least one mist generating device in a sidewall configuration where the enclosure height ranges between about 1.0 m.

(3.3 ft.) to about 8.0 m. (26.2 ft.), the mounting being beneath the ceiling at a distance from the ceiling ranging from about 1.0 m. (3.3 ft.) to about one half the enclosure height and with a clearance of at least 1.0 m. (3.3 ft.) from any of the plurality of corners of the enclosed space;

(iv) mounting at least two mist generating devices in a pendent configuration where the enclosure height ranges between about 3.0 m. (9.8 ft.) to about 8.0 m. (26.2 ft.) with a clearance from any of the plurality of walls of the enclosed space ranging from 0.3 m (1 ft.) to about 3.4 m. (11 ft.) and spaced from one another by a distance ranging from about 3.4 m. (11 ft.) to about 30.4 ft; and

(v) mounting at least two mist generating devices in a sidewall configuration where the sidewall enclosure height ranges between about 1.0 m. (3.3 ft.) to about 8.0 m. (26.2 ft.) beneath the ceiling at a distance from the ceiling ranging from about 1.0 m. (3.3 ft.) to about one half the ceiling enclosure height and with a clearance of at least 1.0 m. (3.3 ft.) from any of the plurality of corners of the enclosed space such that the at least two mist generating devices each define a center line of discharge having an unobstructed discharge path with a diameter of about 1.5 m. (5 ft.) from the device to an opposing wall of the plurality of walls, the device being mounted from the opposing wall at a distance ranging between about 3.8 m. (12.5 ft.) to about 12.0 m. (39.3 ft.) with the center lines of discharge of the at least two devices have a perpendicular spacing ranging between about 1.0 m. (3.3 ft.) to about 4.6 m. (15 ft.);

piping a self-contained fluid supply source to the mist generating device, the piping including coupling an outlet of a liquid supply tank having a capacity of at least 25 gallons to the mist generating device, the piping including coupling in parallel a gas supply having a bank of at least three pressurized 11.3 cu. m. (400 cu. ft.) tanks with the liquid supply tank and the mist generating device; and interlocking an actuator to release the gas from the cylinders to the tank and the at least one mist generating device, the interlocking including coupling the actuator with a heat release detector disposed in the enclosed space, the heat detector being responsive to a fire in the enclosed space such that upon detection of a fire, the heat detector signals the actuator to release the gas from the cylinders to pressurize the tank and delivery of the gas to the mist generating device.

13. A fire protection system for addressing a fire with a mist, the system comprising:

at least one mist generating device disposed in an enclosed space having a volume of at least 130 cu. m. (4590 cu. ft.), the at least one mist generating device comprising: a first fluid passage having a first fluid inlet and a first fluid outlet disposed about a longitudinal axis of the device; and a second fluid passage having a second fluid inlet and a second fluid outlet through which a second fluid passes, the second fluid passage disposed about the longitudinal axis concentric with the first fluid passage,

wherein the ratio of the cross sectional area of the first fluid outlet to the second fluid outlet is between 10:3 and 1:12; and

a fluid supply source including a liquid supply coupled to the first fluid inlet for discharge of liquid from the first fluid outlet, the fluid supply further including a gas supply coupled to the second fluid inlet at a pressure ranging from about 2.1 bar (30 psi.) to about 24.1 bar (350 psi.) for discharge from the second fluid outlet to mix with the liquid in an optional chamber so as to form the mist to address the fire, the fluid supply further having a property that is selected from the group consisting of:

(i) the liquid supply pressurized by the gas supply, the liquid supply being coupled to the first fluid inlet to provide the liquid to the inlet at a pressure of at least 0.5 bar (7 psi.) for liquid flow through the first fluid passage;

(ii) a pressurized gas supply that includes a bank of at least three (3) 11.3 cu. m. (400 cu. ft.) nitrogen gas cylinders, each cylinder being coupled to a piping manifold coupled to the second fluid outlet with a regulated discharge pressure from the manifold of at least 6.9 bar (100 psi.), and a liquid supply that includes at least one ninety-five liter (95 L.) (twenty-five gallon (25 gal.)) tank of fire fighting liquid pressurized by the gas supply discharge pressure, the tank being coupled to the first fluid inlet;

(iii) the total liquid supply ranging between about fifty-seven liters (57 L.) (fifteen gallons (15 gal.)) to about ninety-five liters (95 L.) (twenty-

five gallons (25 gal.)) for each 130 cu. m. (4590 cu. ft.) of enclosed space; and

(iv) the liquid and gas being provided to the device in a liquid-to-gas mass flow ratio ranging from about 1:1 to about 3:1.

14. The system of claim 14, wherein the fluid supply source is a self-contained fluid supply source.

15. The system of claim 14 or claim 15, wherein the first fluid outlet discharges the liquid as an annulus.

16. The system of any of claims 14 to 16, wherein the mist further has a property that is selected from the group consisting of:

(i) a majority of droplets having a diameter ranging from 1 to 10 microns;

(ii) defines a total extinguishing volume of less than about 8 gallons (8 gal.) for each 130 cu. m. (4590 cu. ft.) of enclosed space; and

(iii) an extinguishment time ranging from about 780 seconds to about 30 seconds for normalized sized fires ranging between about 1 kW/cu. m. to about 8 kW/cu. m.

17. A method of mist fire protection to address a fire in a substantially enclosed space having a volume of at least one hundred thirty cubic meters (130 cu. m. (4590 cu. ft.)), the method comprising:

using at least one mist generating device disposed in the space for discharge of a mist into the space, the at least one mist generating device comprising: a first fluid passage having a first fluid inlet and a first fluid outlet disposed about a longitudinal axis of the device; and a second fluid passage having a second fluid inlet and a second fluid outlet through which a second fluid passes, the second fluid passage disposed about the longitudinal axis concentric with the first fluid passage, wherein the ratio of the cross sectional area of the first fluid outlet to the second fluid outlet is between 10:3 and 1:12; and

generating a liquid mist using the at least one mist generating device including: delivering a liquid as the first fluid to the first fluid inlet through the first fluid passage for a discharge of the liquid from the first fluid outlet; delivering a gas as the second fluid of to the second fluid inlet of the device at an operating pressure ranging between about 2.1 bar (30 psi.) to about 24.1 bar (350 psi.) for gas flow through the second fluid passage and discharge from the second fluid outlet to mix with the liquid so as to form the mist; and distributing the mist throughout the enclosed space, the distributing including discharging the liquid and the gas from the mist generating device for a discharge time of at least ten minutes, the

discharging the gas includes discharging the gas at a velocity of at least sonic velocity.

18. The method of claim 18, wherein the first fluid outlet discharges the liquid as an annulus.

19. The method of either claim 18 or claim 19, wherein the mist further has a property that is selected from the group consisting of:

(i) a majority of droplets having a diameter ranging from 1 to 10 microns;

(ii) defines a total extinguishing volume of less than about 8 gallons (8 gal.) for each 130 cu. m. (4590 cu. ft.) of enclosed space; and

(iii) an extinguishment time ranging from about 780 seconds to about 80 seconds for normalized sized fires ranging between about 1 kW/cu. m. to about 8 kW/cu. m.

20. A method of assembling a mist generating device, comprising the steps of:

forming a base member containing first and second fluid supply channels;

forming a funnel member containing a bore, and axially and concentrically locating the funnel member on the base member such that the bore communicates with the second fluid supply channel;

forming an elongate plug member, and axially and concentrically attaching the plug member to the base member such that a portion of the plug member lies within the bore and a second fluid passage is defined between the concentric funnel and plug members;

forming a cover member, the cover member having a first end adapted to enclose the funnel and plug members, and adapted to axially and concentrically locate on the base member, the cover member further comprising a second end having an outlet; and

attaching the cover member to the base member such that a first fluid passage is defined between an external surface of the funnel member and an internal surface of the cover member, such that a first fluid outlet of the first fluid passage and the second fluid outlet communicate with the outlet of the cover member, and the ratio of the cross sectional area of the first fluid outlet to the second fluid outlet is between 10:3 and 1:12.

What is claimed is:

1. A mist generating device comprising: a first fluid passage (1080) having a first fluid inlet (1082) and a first fluid outlet (1084) disposed about a longitudinal axis (L) of the device; and a second fluid passage (1090) having a second fluid inlet (1047) and a second fluid outlet (1094) through which a second fluid passes, wherein the first and second fluid passage outlets (1084,1094) are oriented relative to one another such that they have an angle of incidence (α) of between 5 and 30 degrees;

characterised in that:

the first fluid passage (1080) surrounds the second fluid passage (1090) and has a divergent-convergent internal geometry such that it defines a curved profile that converges to the first fluid outlet (1084);

wherein the second fluid passage (1090) defines an equivalent angle of expansion of between 1 and 40 degrees and includes a throat portion (1092) located between the second fluid inlet (1047) and the second fluid outlet (1094), the throat portion (1092) having a smaller cross sectional area than that of both the second fluid inlet (1047) and second fluid outlet (1094) such that the area ratio between the throat portion (1092) and the second fluid passage outlet (1094) is between 5:7 and 2:11; and

wherein the ratio of the cross sectional area of the first fluid passage outlet (1084) to the second fluid passage outlet (1094) is between 10:3 and 1:12.

2. The device of claim 1, wherein the cross sectional area of the second fluid outlet (1094) is between 4 and 7 times greater than that of the first fluid outlet (1084).

3. The device of either preceding claim, wherein the second fluid passage throat portion (1092) and the second fluid outlet (1094) surround the longitudinal axis (L) of the device, and the second fluid inlet (1047) is radially offset from the longitudinal axis (L).

4. The device of any preceding claim, wherein the first fluid passage (1080) is located radially outward from the second fluid passage (1090).

5. The device of any preceding claim wherein the second fluid passage (1090) is partly defined by an elongate plug (1050) which is co-axial with the longitudinal axis (L) of the device.

6. The device of any preceding claim, wherein the first fluid passage (1080) includes an intermediate portion located between the first fluid inlet (1018) and the first fluid outlet (1084), the intermediate portion having a cross sectional area which is between 50 and 400 times greater than that of the first fluid outlet (1084).

7. The device of claim 5, wherein the plug (1050) has first and second ends, and the second end comprises a concave end face which is surrounded by the first and second fluid passage outlets (1084,1094).

8. The device of any preceding claim, wherein the first fluid passage (1080) defines a total volume of between 119000 mm^3 and 121500 mm^3 and the second fluid passage (1090) defines a total volume of between 24300 mm^3 and 25500 mm^3.

9. The device of any preceding claim, further comprising:

a first fluid supply channel having a first end adapted to be connected to a supply of a first fluid and a second end connected to the first fluid inlet; and

a second fluid supply channel having a first end adapted to be connected to a supply of a second fluid and a second end connected to the second fluid inlet;

wherein the first and second supply channels are substantially parallel to the longitudinal axis (L) of the device.

10. The device of any preceding claim further comprising a chamber in communication with the first and second fluid outlets (1084,1094) for mixture of the liquid and gas discharge so as to form the mist.

11. The device of any preceding claim, wherein the cross sectional area of the throat portion (1092) of the second passage (1090) is between $20mm^2$ and $35mm^2$.

12. A method of assembling a mist generating device, comprising the steps of:

forming a base member (1012) containing first and second fluid supply channels (1018,1020);

forming a funnel member (1030) containing a bore (1046), and axially and concentrically locating the funnel member (1030) on the base member (1012) such that the bore (1046) communicates with the second fluid supply channel (1020);

forming an elongate plug member (1050), and axially and concentrically attaching the plug member (1050) to the base member (1012) such that a portion of the plug member (1050) lies within the bore (1046) and a second fluid passage (1090) is defined between the concentric funnel and plug members (1030,1050);

forming a cover member (1070), the cover member (1070) having a first end (1072) adapted to enclose the funnel and plug members (1030,1050), and adapted to axially and concentrically locate on the base member (1012), the cover member (1070) further comprising a second end (1074) having an outlet; and

attaching the cover member (1070) to the base member (1012) such that a first fluid passage (1080) is defined between an external

surface (1037) of the funnel member (1030) and an internal surface (1075) of the cover member (1070), the first passage (1080) having a divergent-convergent internal geometry such that it defines a curved profile that converges to a first fluid outlet (1084) of the first passage (1080), and wherein the first fluid outlet (1084) and the second fluid outlet (1094) communicate with the outlet of the cover member (1070), the first and second fluid outlets (1084,1094) are oriented relative to one another such that they have an angle of incidence (α) of between 5 and 30 degrees, and the ratio of the cross sectional area of the first fluid outlet (1084) to the second fluid outlet (1094) is between 10:3 and 1:12.