What Is Claimed Is:

1. A dry sprinkler comprising:

an outer structural assembly having a proximal inlet, a distal outlet, and an internal passageway extending between the inlet and the outlet defining a longitudinal axis of the sprinkler, the outer structural assembly including:

an inlet fitting including a proximal head portion and a distal body portion, the head portion having an external thread defining a nominal external thread diameter, the body portion including an external groove defining a nominal groove diameter being greater than the nominal external thread diameter, the external thread and groove providing the sprinkler with alternate threaded and grooved coupling arrangements for connection to a fluid supply pipe, the inlet fitting having an internal surface defining a sealing surface of the dry sprinkler;

an outlet frame including a deflector axially spaced at a fixed distance from the outlet; and

a casing tube disposed between the inlet fitting and an outlet frame;

a seal assembly disposed along the passageway for contacting the sealing surface; and

a thermal trigger for supporting the seal assembly against the sealing surface in an unactuated state of the dry sprinkler .

2. The dry sprinkler of claim 1, wherein the inlet fitting has an outer surface portion that forms a transition between the proximal head portion and the distal body portion so as to define a transition portion between the external thread and the external groove.

3. The dry sprinkler of claim 2, wherein the transition defines a step transition between the external thread and the external groove, the step transition defining a surface that extends substantially perpendicularly to the longitudinal axis of the axis.

4. The dry sprinkler of claim 1, wherein the external groove defines a nominal two inch diameter and the casing tube defines a nominal 1-1/2 inch.

5. The dry sprinkler of claim 1, wherein the external groove defines a nominal two inch diameter and the external thread defines a nominal thread of any one of a nominal 3/4 inch, 1 inch, and 1-1/4 inch NPT.

6. The dry sprinkler of claim 1, wherein the seal assembly is supported by an internal assembly having a fluid tube, a guide tube and trigger seat supported by the thermal trigger in the unactuated state of the sprinkler, the fluid tube including a plurality of apertures and a plurality of projections.

7. The dry sprinkler of claim 1, wherein sprinkler defines a sprinkler axial length ranging from about 9 inches to about 48 inches.

8. The dry sprinkler of claim 1, wherein the distal body portion defines an external diameter of about two inches, and the sealing surface defines an internal opening diameter of about 1-¼ inch.

9. The dry sprinkler of any one of claims 1-8, wherein the external thread extends proximally of the sealing surface.

10. The dry sprinkler of any one of claims 1-8, wherein the external thread extends distally of the sealing surface.

11. The dry sprinkler of any one of claims 1-10, wherein the distal body portion of the inlet fitting includes an outer surface distal of the external groove that tapers toward the casing tube.

12. The dry sprinkler of any one of claims 1-10, wherein the casing tube defines a nominal 1-1/2 inch.

13. A system for connecting a dry sprinkler to a fluid supply pipe, the system comprising:

a fluid supply pipe fitting; and

a dry sprinkler having an inlet fitting, an outlet frame and a casing tube between the inlet fitting, and the outlet frame to define a passageway of the sprinkler, the inlet fitting including a proximal head portion and a distal body portion with a transition portion between the proximal head and distal body portions, the head portion having an external thread, the body portion including an external groove, the sprinkler including an internal assembly to seal the passageway at the inlet fitting, and

one of a threaded-type coupling connection and a grooved-type coupling connection between the inlet fitting and the fluid supply pipe fitting,

wherein in the threaded-type coupling connection, the fluid supply pipe fitting is an internally threaded fitting, the external threads being threaded into the threaded pipe fitting; and

wherein in the grooved-type coupling connection, the fluid supply pipe fitting is a grooved fitting coupled to the external groove of the inlet fitting with the external thread being substantially disposed within the grooved fitting.

14. The system of claim 13, wherein the external thread defines a nominal external thread diameter and the external groove defines a nominal groove diameter being greater than the external thread diameter.

15. The system of claim 13, wherein the distal body portion of the inlet fitting includes an outer surface distal of the external groove that tapers toward the casing tube.

16. The system of claim 13, wherein the casing tube defines a nominal diameter of 1-1/2 inch.

17. The system of claim 13, wherein the transition portion defines an external diameter of about two inches, and the sealing surface defines an internal opening diameter of about 1-¼ inch.

18. The system of any one of claims 13-17, wherein the external thread extends proximally of the sealing surface.

19. The system of any one of claims 13-17, wherein the external thread extends distally of the sealing surface.

20. The system of any one of claims 13-17, wherein the internal assembly comprises a fluid tube, a guide tube and trigger seat supported by the thermal trigger in the unactuated state of the sprinkler, the fluid tube including a plurality of apertures and a plurality of projections.

21. A method of coupling a dry sprinkler to a fluid supply pipe, the dry sprinkler having an inlet fitting, an outlet frame and a casing tube between the inlet fitting, and an internal assembly to seal the passageway at the inlet fitting, the method comprising:

disposing the inlet fitting of the dry sprinkler along the fluid supply pipe, the inlet fitting having a proximal head portion and a distal body portion, the body portion including a transition portion between the proximal head and distal body portions, the head portion having an external thread, the body portion including an external groove;

forming one of a threaded-type coupling connection and a grooved-type coupling connection between the inlet fitting and a fluid supply pipe fitting,

wherein forming the threaded-type coupling connection includes threading the external threads to an internally threaded pipe fitting; and

wherein forming the grooved-type coupling connection includes coupling the external groove of the inlet fitting to a grooved fluid supply pipe fitting and disposing the external thread within the grooved fluid supply pipe fitting.

22. The method of claim 21, wherein forming the threaded connection includes engaging the transition portion with the threaded pipe fitting.

23. The method of claim 21, wherein forming the grooved-type connection includes engaging the transition portion with the grooved pipe fitting.

WHAT IS CLAIMED IS :

1. A dry sprinkler comprising:

an outer structural assembly having a proximal inlet, a distal outlet, and an internal passageway extending between the inlet and the outlet defining a longitudinal axis of the sprinkler, the outer structural assembly including:

an inlet fitting including a proximal head portion and a distal body portion, the head portion having an external thread defining a nominal external thread diameter, the body portion including an external groove defining a nominal groove diameter being greater than the nominal external thread diameter, the external thread and groove providing the sprinkler with alternate threaded and grooved coupling arrangements for connection to a fluid supply pipe, the inlet fitting having an internal surface with four sections, each of the four sections defining a different portion of the internal passageway, the first section defining an inlet portion with a sealing surface of the dry sprinkler, the second section defining an expanding region of the internal passageway to a third portion that defines the widest portion of the internal passageway, and a fourth portion that converges the internal passageway in an axial-to-distal direction, inlet fitting having an outer surface portion that forms a transition between the proximal head portion and the distal body portion to define a transition portion between the external thread and the external groove, the transition portion defining a stop surface;

an outlet frame including a deflector axially spaced at a fixed distance from the outlet; and

a casing tube disposed between the inlet fitting and an outlet frame;

a seal assembly disposed along the passageway for contacting the sealing surface; and

a thermal trigger for supporting the seal assembly against the sealing surface in an unactuated state of the dry sprinkler .

2. The dry sprinkler of claim 1, wherein the transition defines a step transition between the external thread and the external groove, the step transition defining the stop surface that extends substantially perpendicularly to the longitudinal axis of the axis.

3. The dry sprinkler of claim 1, wherein the external groove defines a nominal two inch diameter and the casing tube defines a nominal 1-1/2 inch.

4. The dry sprinkler of claim 1, wherein the external groove defines a nominal two inch diameter and the external thread defines a nominal thread of any one of a nominal 3/4 inch, 1 inch, and 1-1/4 inch NPT.

5. The dry sprinkler of claim 1, wherein the seal assembly is supported by an internal assembly having a fluid tube, a guide tube and trigger seat supported by the thermal trigger in the unactuated state of the sprinkler, the fluid tube including a plurality of apertures and a plurality of projections.

6. The dry sprinkler of claim 1, wherein sprinkler defines a sprinkler axial length ranging from about 9 inches to about 48 inches.

7. The dry sprinkler of claim 1, wherein the distal body portion defines an external diameter of about two inches, and the sealing surface defines an internal opening diameter of about 1-¼ inch.

8. The dry sprinkler of claim 1, wherein the external thread extends proximally of the sealing surface.

9. The dry sprinkler of claim 1, wherein the external thread extends distally of the sealing surface.

10. The dry sprinkler of claim 1, wherein the distal body portion of the inlet fitting includes an outer surface distal of the external groove that tapers toward the casing tube.

11. The dry sprinkler of claim 1, wherein the casing tube defines a nominal 1-1/2 inch.

12. A system for connecting a dry sprinkler to a fluid supply pipe, the system comprising:

a fluid supply pipe fitting; and

a dry sprinkler having an inlet fitting, an outlet frame and a casing tube between the inlet fitting, and the outlet frame to define a passageway of the sprinkler, the inlet fitting including a proximal head portion and a distal body portion with a transition portion between the proximal head and distal body portions, the head portion having an external thread, the body portion including an external groove, the sprinkler including an internal assembly to seal the passageway at the inlet fitting, and

one of a threaded-type coupling connection and a grooved-type coupling connection between the inlet fitting and the fluid supply pipe fitting,

wherein in the threaded-type coupling connection, the fluid supply pipe fitting is an internally threaded fitting, the external threads being threaded into the threaded pipe fitting; and

wherein in the grooved-type coupling connection, the fluid supply pipe fitting is a

grooved fitting coupled to the external groove of the inlet fitting with the external thread being substantially disposed within the grooved fitting; and

wherein the inlet fitting comprises an internal surface with four sections, each of the four sections defining a different portion of the internal passageway, the first section defining an inlet portion with a sealing surface of the dry sprinkler, the second section defining an expanding region of the internal passageway to a third portion that defines the widest portion of the internal passageway, and a fourth portion that converges the internal passageway in an axial-to-distal direction, and inlet fitting having an outer surface portion that forms a transition between the proximal head portion and the distal body portion to define a transition portion between the external thread and the external groove, the transition portion defining a stop surface.

13. The system of claim 12, wherein the external thread defines a nominal external thread diameter and the external groove defines a nominal groove diameter being greater than the external thread diameter.

14. The system of claim 12, wherein the distal body portion of the inlet fitting includes an outer surface distal of the external groove that tapers toward the casing tube.

15. The system of claim 12, wherein the casing tube defines a nominal diameter of 1-1/2 inch.

16. The system of claim 12, wherein the transition portion defines an external diameter of about two inches, and the sealing surface defines an internal opening diameter of about 1-¼ inch.

17. A method of coupling a dry sprinkler to a fluid supply pipe, the dry sprinkler having an inlet fitting, an outlet frame and a casing tube between the inlet fitting, and an internal assembly to seal the passageway at the inlet fitting, the method comprising:

disposing the inlet fitting of the dry sprinkler along the fluid supply pipe, the inlet fitting having a proximal head portion and a distal body portion, the body portion including a transition portion between the proximal head and distal body portions, the head portion having an external thread, the body portion including an external groove;

forming one of a threaded-type coupling connection and a grooved-type coupling connection between the inlet fitting and a fluid supply pipe fitting,

wherein forming the threaded-type coupling connection includes threading the external threads to an internally threaded pipe fitting; and

wherein forming the grooved-type coupling connection includes coupling the external groove of the inlet fitting to a grooved fluid supply pipe fitting and disposing the external thread within the grooved fluid supply pipe fitting; and

wherein the inlet fitting comprises an internal surface with four sections, each of the four sections defining a different portion of the internal passageway, the first section defining an inlet portion with a sealing surface of the dry sprinkler, the second section defining an expanding region of the internal passageway to a third portion that defines the widest portion of the internal passageway, and a fourth portion that converges the internal passageway in an axial-to-distal direction, and inlet fitting having an outer surface portion that forms a transition between the proximal head portion and the distal body portion to define a transition portion between the external thread and the external groove, the transition portion defining a stop surface.

18. The method of claim 17, wherein forming the threaded connection includes engaging the transition portion with the threaded pipe fitting.

19. The method of claim 17, wherein forming the grooved-type connection includes engaging the transition portion with the grooved pipe fitting.