CLAIMS

We claim:

1. A storage occupancy sprinkler system comprising:

a fluid supply system;

at least one cross-main pipe fluidly connected with the fluid supply system;

a plurality of branchlines extending from, and are fluidly connected with, the at least one cross-main pipe; and

a plurality of storage sprinkler heads projecting from, and fluidly connected with, the plurality of branchlines, wherein the storage sprinkler heads have a k-factor of at least 11.2 and a sprinkler rating greater than 200 psi.

2. The storage occupancy sprinkler system of claim 1, wherein the branchlines have an inside diameter between approximately 1.61 inches and approximately 3.32 inches.

3. The storage occupancy sprinkler system of claim 1, wherein the fluid supply system comprises a main pump and a jockey pump.

4. The storage occupancy sprinkler system of claim 1, wherein the fluid supply system provides a supply pressure, the supply pressure being greater than 175 psi.

5. The storage occupancy sprinkler system of claim 4, wherein each storage sprinkler head of the plurality of storage sprinkler heads has an RTI of less than 50.

6. The storage occupancy sprinkler system of claim 1, wherein the storage sprinkler heads have a sprinkler rating of at least 250 psi.

7. The storage occupancy sprinkler system of claim 1, wherein the storage sprinkler heads have a sprinkler rating of up to 300 psi.

8. A storage occupancy sprinkler system comprising:

a fluid supply system;

at least one cross-main pipe fluidly connected with the fluid supply system, the at least one cross-main pipe having a near cross-main pipe and a far cross-main pipe;

a plurality of branchlines extending between, and are fluidly connected with, the near cross-main pipe and the far cross-main pipe; and

a plurality of storage sprinkler heads projecting from, and fluidly connected with, the plurality of branchlines, wherein the storage sprinkler heads have a k-factor of at least 11.2 and a sprinkler rating greater than 175 psi.

9. The storage occupancy sprinkler system of claim 1, wherein the storage occupancy sprinkler system is a ceiling-only system.

10. A sprinkler system for providing fire suppression to a storage occupancy, the storage occupancy comprising a floor and a ceiling located at a height greater than 35 feet above the floor, the sprinkler system comprising:

a fluid supply system capable of providing a static pressure of greater than 200 psi;

a control valve fluidly connected with the fluid supply system;

a check valve located downstream of the control valve and fluidly connected thereto;

a plurality of storage sprinkler heads, the storage sprinkler heads each having:

a body with an orifice therethrough, the orifice being sealed by a sealing assembly configured to withstand a hydrostatic strength test pressure of greater than 700 psi and which has a rated pressure greater than 200 psi,

a nominal k-factor rating of at least k16.8, and

a thermal trigger having an RTI of less than 50; and

a network of pipes extending between and fluidly connecting the check valve and the plurality of storage sprinklers heads.

11. The sprinkler system of claim 10, wherein the fluid supply system comprises a fluid source and at least one pump.

12. The sprinkler system of claim 10, wherein the fluid supply system comprises a main pump and a jockey pump.

13. The sprinkler system of claim 10, wherein the plurality of storage sprinkler heads are located proximate to the ceiling.

14. The sprinkler system of claim 13, wherein each storage sprinkler head of the plurality of storage sprinkler heads includes a fluid deflector located at a distance of between approximately 4 inches and approximately 30 inches from the ceiling.

15. The sprinkler system of claim 10, further comprising at least one storage rack, the at least one storage rack having at least one commodity stored thereupon at a storage height of greater than twelve feet above the floor.

16. A sprinkler system for providing fire suppression to a storage occupancy, the storage occupancy comprising a floor and a ceiling located at a height greater than 35 feet above the floor, the sprinkler system comprising:

a fluid supply system capable of providing a static pressure of greater than 175 psi;

a control valve fluidly connected with the fluid supply system;

a check valve located downstream of the control valve and fluidly connected thereto;

a plurality of storage sprinkler heads, the storage sprinkler heads each having:

a body with an orifice therethrough, the orifice being sealed by a sealing assembly configured to withstand a hydrostatic strength test pressure of greater than 700 psi and which has a rated pressure greater than 175 psi,

a nominal k-factor rating of at least k16.8, and

a thermal trigger having an RTI of less than 50;

a network of pipes extending between and fluidly connecting the check valve and the plurality of storage sprinklers heads; and

at least one storage rack, the at least one storage rack having at least one commodity stored thereupon at a storage height of greater than twelve feet above the floor, wherein at a least a portion of the plurality of storage sprinkler heads are disposed within the at least one rack.

17. The sprinkler system of claim 10, wherein the plurality of storage sprinkler heads are chosen from a group consisting of pendent sprinklers and upright sprinklers.

18. The sprinkler system of claim 10, wherein each storage sprinkler head of the plurality of storage sprinkler heads is an ESFR sprinkler.

19. A method of determining a branchline size for a storage occupancy sprinkler system having a fluid supply system, at least one cross-main pipe fluidly connected with the fluid supply system, a plurality of branchlines extending from, and fluidly connected with, the at least one cross-main pipe, and a plurality of storage sprinkler heads projecting from, and fluidly connected with, the plurality of branchlines, the method comprising the steps of:

(I) selecting a type of storage sprinkler head having a k-factor of at least 11.2 and a sprinkler rating greater than 175 psi, to employ for the plurality of storage sprinkler heads;

(II) determining a design area for the storage occupancy sprinkler system;

(III) selecting a branchline size for the storage occupancy sprinkler system;

(IV) calculating a system demand for the storage occupancy sprinkler system according to the selected storage sprinkler head within the determined design area and according to the selected branchline size;

(V) selecting a main pump capable of supplying a combination of the calculated system demand and an additional safety factor;

(VI) calculating a pump rated pressure of the selected main pump;

(VII) calculating a static output pressure of the selected main pump based on the pump rated pressure;

(VIII) calculating a supply pressure based on the static output pressure of the selected main pump; and

(IX) if the calculated supply pressure is less than 175 psi, repeating steps (I) – (VIII), wherein the selected branchline size is a first branchline size and step (III) comprises selecting a second branchline size smaller than the first branchline size,

OR

if the calculated supply pressure is greater than the sprinkler rating of the selected storage sprinkler, repeating steps (I) – (VIII), wherein the selected branchline size is a first branchline size and step (III) comprises selecting a second branchline size greater than the first branchline size; and

(X) repeating step (IX) until a branchline size is selected that results in a closest supply pressure to the sprinkler rating of the selected storage sprinkler without exceeding the sprinkler rating of the selected storage sprinkler.

20. The storage occupancy sprinkler system of claim 1, wherein the storage sprinkler heads have a sprinkler rating of at least 210 psi.

21. The storage occupancy sprinkler system of claim 1, wherein the storage sprinkler heads have a sprinkler rating of at least 220 psi.

22. The storage occupancy sprinkler system of claim 1, wherein the storage sprinkler heads have a sprinkler rating of at least 230 psi.

23. The storage occupancy sprinkler system of claim 1, wherein the storage sprinkler heads have a sprinkler rating of at least 240 psi.