A semi-rigid polyolefin water heater gasket is employed to increase the speed and reduce the cost of installing a urethane leakage barrier between an inner water heater vessel and an outer shell. The gasket comprises a strip of polyolefin material that is wrapped around the exterior of an inner water vessel in the space between the inner vessel and the outer shell. This gasket provides a leakage barrier secured in this space and prevents liquid urethane from flowing beyond the gasket or gas dam ring. An adhesive can bond the gasket in the gap.
POLYOLEFIN SEALING GASKET

BACKGROUND OF THE INVENTION

1. Field of the Invention
The present invention relates to a gasket used in making water heaters optimally insulated by forming a seal that prevents the flow of foamed urethane insulation out of the bottom of the heater during the assembly procedure and to a method of making water heaters using the gasket.

2. Background of the Invention
Water heaters have been manufactured with the goal of providing efficiently raised and maintained water temperature by using an appropriate insulating material. Once the water temperature in the heater reaches a desired level, the insulating material will help to hold that temperature at the desired level.

Most water heaters contain an inner vessel that holds water and is combined with a heater that can heat the held water. An outer shell encircles the inner vessel and forms a space between it and the inner vessel which is usually filled with an insulating material. The outer shell forms the exterior of the water heater and is usually finished with a colored coating.

The insulating material has historically been formed of fiberglass. Eventually, a foamed insulating material was developed using liquid chemicals which would foam when mixed and flow and be distributed in the space between the inner vessel and the outer shell before hardening.

The foamed urethane was a more cost effective material to be used in the manufacturing process than fiberglass and was even more preferred since its thermal characteristics were equal to or better than those of fiberglass. The only problem with using foamed urethane produced by mixing liquid chemicals was the containment of these chemicals until they foam and harden in place. Thus leak prevention of the liquid urethane became the primary obstacle to overcome, and gaskets to prevent liquid urethane leakage were developed.

Several types of gaskets have been designed. Some of them are reasonably effective in limiting urethane leakage, but most are either very expensive or inconsistent in their ability to completely stop the flow of liquid urethane as the gasket was reached. One gasket was formed as a collar which was thereafter filled with an expandable foam. Another was formed with a combination of a fiberglass wrap and a plastic envelope around the bottom of the water heater. An expandable foam was then injected into the plastic envelope which formed a gasket. Another gasket used a toroidally shaped plastic tube filled with air with the tube acting as a gasket to prevent the leakage of the liquid urethane after air is injected into the plastic tube. Another gasket embodied a wedge shaped device that opened to receive some of the liquid urethane and thereby prevented leaks from dripping beyond the gasket. Another gasket-like device uses a resilient flexible material that forms a ring around the base of the water heater. The ring is specially treated with a lubricant to place and hold it in the desired position.

While many of these developments experienced some success, there is still a need to improve on the capture of wet insulating mix until it hardens, and it is to that need that the present invention is directed.

SUMMARY AND OBJECTIVES

The present invention is a semi-rigid polyolefin water heater gasket to achieve speed in installation and to be cost competitive when compared to other useable materials. The polyolefin gasket will wrap around the exterior circumference of the inner vessel (in the space between the inner vessel and the outer shell) and provide an ample leakage barrier that prevents the liquid urethane from flowing beyond the gasket (gas dam ring). The gasket is secured to the inner vessel or outer shell by an adhesive. The adhesive bond together with the semi-rigid polyolefin foam creates a reliable leak prevention system that is efficiently installed during the manufacturing process.

From the foregoing summary, it can be seen that a primary objective of the present invention is to provide a polyolefin sealing gasket for a hot water heater that overcomes defects and inefficiencies of prior art devices and provides new materials and features not previously known.

Another objective of the present invention is to provide a gasket for a hot water heater that can be continuously extruded in semi-rigid form and automatically cut into preselected lengths, each such length being suitable for installation in a water heater being manufactured.

Yet another objective of the present invention is to provide a hot water heater gasket of the type described which is fire retardant.

Yet another objective of the present invention is to provide a gasket of the type described in which the ends of the gasket connect in a spiral overlap.

A further objective of the present invention is to provide a gasket of the type described wherein the ends of which will be joined in an end-to-end relationship.

Yet still another objective of the present invention is to provide a gasket of the type described which has a circular cross section.

Another objective of the present invention is to provide a gasket of the type described which has a “D” shaped cross section.

And still another objective of the present invention is to provide a gasket of the type described which has a square cross section.

Thus there has been outlined the more important features of the invention in order that detailed description that follows may be better understood and in order that the present contribution the art may be better appreciated. There are, of course, additional features of the invention that will described hereinafter and which will form the subject matter of the claims appended hereto. In

Thus there has been outlined the more important features of the invention in order that the detailed description that follows may be better understood and in order that the present contribution to the art may be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject matter of the claims appended hereto. In that respect, before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not limited in its arrangement of the components set forth in the following description and illustrated in the drawings. The invention is capable of other embodiments and of being practiced and carried out in various ways.
It is also to be understood that the phraseology and terminology employed herein are for the purpose of description and should not be regarded as limiting in any respect. Those skilled in the art will appreciate that the concept upon which this disclosure is based may readily be utilized as a basis for designing other structures, methods and systems for carrying out the several purposes of this development. It is important that the claims be regarded as including such equivalent methods and products resulting therefrom that do not depart from the spirit and scope of the present invention. The application is neither intended to define the invention of the application, which is measured by its claims, nor to limit its scope in any way.

Thus, the objectives of the invention set forth above, along with the various features of novelty, which characterize the invention, are noted with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and the specific results obtained by its use, reference should be made to the following detailed specification taken in conjunction with the accompanying drawings wherein like characters of reference designate like parts throughout the several views.

The drawings are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification. They illustrate embodiments of the invention and, together with their description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1, parts A through F, is a schematic representation of the sequential steps of the water heater manufacturing process of the present invention.

FIG. 2 is a perspective view of one embodiment of a gasket comprising a part of the present invention.

FIG. 3 is a cross sectional view of the gasket shown in FIG. 2.

FIG. 4 is a perspective view of another embodiment of a gasket comprising a part of the present invention.

FIG. 5 is a cross sectional view of the gasket shown in FIG. 4.

FIG. 6 is a cross sectional view of another embodiment of the gasket comprising a part of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

To convey an understanding of the principles of the invention, reference will now be made to the embodiments set forth in FIGS. 1-7 of the drawings and specific language will be used to describe these principles. It will nevertheless be understood that no limitation of the scope of the invention is intended.

Referring now to the drawings and particularly to FIG. 1, a gasket 10 (FIG. 10B) is circularly illustrated in isolation. The material of the gasket of the present invention is a polyolefin having a density of between 0.5 and 6.5 pounds, a compressive strength of between 4.5 and 12.5 psi, and may include a fiberglass or foamed material such as urethane, polyethylene, polyurethane or plastic.

The method of constructing the water heater is illustrated in FIG. 1. Inner vessel 12 holds the water inside to be heated. Gasket 10 encircles vessel 14 and is held there by tape or adhesive (not shown). Gasket 10 can either be fastened to vessel 14 as shown in FIG. 1C or be fastened to the inside of outer shell 16. With gasket 10 in place, outer shell 16 is positioned over vessel 14 as shown in FIGS. 10D, E and F thereby forming an annular space 18. Space 18 is then filled with foamed urethane 20 made by mixing liquid chemicals. Gasket 10 prohibits the flow of the foamed urethane while still in liquid form, and eventually fills annular space 18 to provide evenly distributed insulation.

Gasket 10 can take many forms. FIG. 2 shows a gasket 10 having a circular cross section 22 (FIG. 3). The diameter of cross section 22 is slightly greater than the radial distance between the outside wall 24 of inner vessel 12 so that cross section 22 is squeezed and distorted when outer shell 16 is positioned over vessel 14.

In another embodiment, gasket 10 has a "D" shaped cross section 26 as shown in FIG. 4. Gasket 10 is positioned around vessel 14 so that the straight side 28 engages outside wall 24. In another embodiment, gasket 10 has a square shaped cross section 30 (FIG. 6).

Gaskets 10 can be glued to vessel outside wall 24 or outside shell inside wall 32. Adhesive may be applied as shown in FIGS. 5 and 6 as 34. Gasket ends 36, 38 (FIG. 2) may be joined end-to-end as shown in FIG. 2 or they may be joined in a spiral overlap as shown in FIG. 5.

Gaskets 10 may be made as a continuous extrusion from an appropriate machine and can receive an application of adhesive and be cut into programmed lengths in line with the extrusion machine. Thus the manufacturing process is efficient and rapid with the cut and glue applied lengths available for immediate use.

From the foregoing description, it can be seen that an apparatus has been provided that will meet all of the advantages of prior art devices and offer additional advantages not heretofore achievable. With respect to the foregoing invention, the optimum dimensional relationship to the parts of the invention including variations in size, materials, shape, form, function, and manner of operation, use and assembly are deemed readily apparent to those skilled in the art, and all equivalent relationships illustrated in the drawings and described in the specification are intended to be encompassed herein.

The foregoing is considered as illustrative only of the principles of the invention. Numerous modifications and changes will readily occur to those skilled in the art, and it is not desired to limit the invention to the exact construction and operation shown and described. All suitable modifications and equivalents that fall within the scope of the appended claims are deemed within the present inventive concept.

What is claimed is:

1. In a water heater having an inner water tank and an outer shell surrounding the inner water tank and defining an annular clearance space between the inner water tank and the outer shell wherein the improvement comprises: an annular gasket formed of extruded polyolefin concentrically disposed between the inner water tank and the outer shell and covering the annular clearance space.

2. The improvement as claimed in claim 1 wherein the gasket has a body portion with two free ends and encircles the outside wall of the inner water tank.

3. The improvement as claimed in claim 2 wherein the gasket is secured to the outside wall of the inner water tank.
4. The improvement as claimed in 3 wherein the two free ends are spirally overlapped with respect to each other.

5. The improvement as claimed in claim 3 wherein the gasket is secured by an adhesive.

6. The improvement as claimed in claim 1 further comprising: means for cutting segments of the extruded polyolefin of a predetermined length as the polyolefin is extruded from the extruding machine.

7. The improvement as claimed in claim 5 wherein the extruded polyolefin has a "D" shaped cross section.

8. The improvement as claimed in claim 5 wherein the extruded polyolefin has a square cross section.

9. The improvement as claimed in claim 2 wherein the extruded polyolefin is polyethylene having a density of between 0.5 and 6.5 pounds and a compressive strength of from 4.5 to 12.5 psi.

10. The improvement as claimed in claim 5 wherein the extruded polyolefin is a foam cross section.

11. The improvement as claimed in claim 2 wherein the extruded polyolefin is fire retardant.

12. The improvement as claimed in claim 6 wherein the extruded polyolefin is flame retardant.

13. A process for constructing a water heater having an inner water tank and an outer shell which is located in spaced relation to and surrounding the inner water tank so as to define an annular clearance space between the inner water tank and the and the outer shell comprising the steps of: providing the inner water tank; providing the outer shell; placing the outer shell in spaced relation to and around the inner water tank; creating an enclosed annular gasket from a length of extruded polyolefin, positioning the annular gasket around and in contact with the inside wall surface of the outer shell, the gasket having a radial thickness greater than the radial width of the annular space, and moving the outer shell downwardly coaxially over the water tank to compress the annular gasket between the inner water tank and the outer shell.

14. The process as claimed 13 wherein the cross section of the annular gasket is "D" shaped.

15. The process as claimed in claim 13 wherein the cross section of the annular gasket is square.

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