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(54) INLET/OUTLET SYSTEM FOR COMPOSITE PRESSURE RECEPTACLES

EINLASS/AUSLASS-SYSTEM FÜR VERBUNDDRUCKBEHÄLTER

SYSTÈME D'ENTRÉE/SORTIE POUR RÉCEPTACLES SOUS PRESSION COMPOSITES

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Description

Field of Art

[0001] The present invention relates to construction of an inlet/outlet system (boss) for composite pressure receptacles.

Background Art

[0002] Composite pressure receptacles are generally used for storing, transporting and distributing fluids and gases under high or low pressures, such as LPG, CNG, industrial gases or air. Typically, a composite pressure receptacle consists of a composite container containing a composite outer shell bearing all pressure loads, an inner liner ensuring sealing of the container, usually made of polymer or metal, and an inlet/outlet system comprising a boss with a thread to fit a valve or a fitting for filling the receptacle and for subsequently distributing the content of the receptacle.

[0003] The inlet/outlet system has to be integrated into the container and ensure gas tightness of the connection between the inner liner and the boss with a connection port. Several types of construction of the boss are known in the prior art. The tightness is ensured by securing the inner liner of the composite container within the boss construction and sealing it by means of a sealing element (typically, a sealing ring) to prevent the leaking of the content. Generally, the external part of the boss is further secured to the receptacle by being at least partially enclosed in the composite outer shell of the composite container to prevent disengaging of the boss from the composite container.

[0004] The inlet/outlet systems known in the art typically protrude from the composite container, thereby being more prone to damage and also increasing the overall length of the composite receptacle. Furthermore, they often have a complex design.

[0005] WO 2013/000959 discloses a composite pressure receptacle with an inlet/outlet system, having the features of the pre-characterizing portion of the independent claim.

[0006] The aim of the present invention is to provide a design of an inlet/outlet system for composite pressure receptacles which could limit the size of the receptacle by embedding the inlet/outlet system within the composite shell, while maintaining a simple, cost-effective construction.

Disclosure of the Invention

[0007] The present invention provides a composite pressure receptacle as defined by claim 1.

[0008] The second part of the plug may preferably further be equipped by a flats or splines to prevent its rotation in a composite shell.

[0009] The aim of the collar is to provide an optimal shape to an inner liner and support it in a zone where sealing is located. Its further aim is to form a "wall" against which the inner liner can be sealed by the sealing element(s). The collar may preferably be made of thermoplastic by injection molding.

[0010] For technological and marking purposes, the boss assembly can be equipped with a labeling ring. The ring may also ensure proper fiber placement around cylinder neck. In the first embodiment it prevents rotation of the plug and thus allows installation of valve.

[0011] Preferably, the inner liner is made of metal, such as steel, or of polymeric material, such as polyethylene or polyethyleneterephtalate.

[0012] The design of the invention allows to embed the inlet/outlet system within the composite container.

[0013] The invention is further illustrated by way of figures and examples, which should however not be construed as limiting the claimed scope.

Brief description of drawings

[0014]

Fig. 1 is a general cross-sectional view of a composite pressure receptacle.

Fig. 2 is a cross-sectional view of the inlet/outlet system according to Example 1.

Fig. 3 is an exploded view of the inlet/outlet system according to Example 1.

Example of carrying out the Invention

Example 1

[0015] Fig. 1 shows a composite pressure receptacle comprising an inner liner 1, an outer composite shell 2, and an inlet/outlet system 3. The inlet/outlet system 3 comprises (Fig. 2, 3):

- a circular collar 8 located circumferentially between the inner liner 1 and the outer composite shell 2, said collar 8 being provided with a recess in a part of its inner diameter destined for being adjacent to the outer shell 2,
- an annular disc 5 having a shape which fits into the recess of the circular collar 8,
- a circular plug 6 with a central opening provided with a thread (tapered or parallel) suitable for engaging a valve or a fitting, and wherein the outer surface of the plug comprises a first portion of the surface located closest to the opening of the inlet/outlet to the outside, a second portion adjacent to the first portion, and the third portion adjacent to the second portion, wherein the first portion comprises a circumferential recess, the second portion is provided with a fixing means to ensure the fixing of the plug 6 in the receptacle and allowing it to withstand pressure loads, and the third part includes at least one groove for inser-

tion of a sealing element 7.

[0016] The second part of the plug 6 has a smaller diameter than the third part of the plug 6, thereby forming the fitting means. The disc 5 adjoins the second part of the plug 6. The recess in the first part of the plug 6 has a smaller diameter than the second part of the plug 6, and receives the end parts of the composite shell and optionally also a labeling ring 4. The second part of the plug 6 may preferably further be equipped by a flats or splines to prevent its rotation in a composite shell.

Industrial Applicability

[0017] The composite pressure receptacles provide with a boss according to the present invention can be used for storage and transportation of fluids and gases under low or high pressure, such as LPG, CNG, industrial gases or air. The described design is particularly suitable for fully wrapped composite cylinders.

Claims

1. A composite pressure receptacle comprising an inner liner (1), an outer composite shell (2) having an inner and an outer surface, and comprising an inlet/outlet system (3), wherein the inlet/outlet system (3) comprises

   - a circular collar (8) located circumferentially between the inner liner (1) and the outer composite shell (2), said collar being provided with a recess in the part of its inner diameter,
   - an annular disc (5) having a shape which fits into the recess of the circular collar,
   - a circular plug (6) with a central opening provided with a thread suitable for engaging a valve or a fitting, and wherein the outer surface of the plug (6) comprises a first portion or the surface located closest to the opening of the inlet/outlet system (3) to the outside, a second portion adjacent to the first portion, and a third portion adjacent to the second portion, wherein the first portion comprises a circumferential recess, the second portion is provided with a fixing means to ensure the fixing of the plug (6) in the receptacle and allowing it to withstand pressure loads, and the third part includes at least one groove for insertion of a sealing element (7),

   characterized in that

   - the recess in the collar is adjacent to the outer composite shell;
   - the circular collar (8) and the annular disc (5) are configured to interact with the inner surface of the outer composite shell (2), and
   - the third part of the plug (6) has a larger diameter than the second part of the plug (6), thereby forming the fitting means; the annular disc (5) adjoins the second part of the plug (6); the recess in the first part of the plug (6) has a smaller diameter than the second part of the plug (6), and receives the end parts of the outer composite shell (2).

2. The composite pressure receptacle according to claim 1, wherein the inlet/outlet system is equipped by labeling ring (4).

3. The composite pressure receptacle according to claim 1 or 2, wherein the inner liner (1) is made of metal, such as steel, or of polymeric material, such as polyethylene or polyethyleneterephtalate.

Patentansprüche

1. Druckbehälter aus Verbundwerkstoff, der eine innere Auskleidung (1), eine äußere Verbundhülle (2) mit einer inneren und einer äußeren Oberfläche und ein Einlass/Auslasssystem (3) umfasst, wobei das Einlass/Auslasssystem (3) umfasst

   - einen kreisförmigen Kragen (8), der in Umfangsrichtung zwischen der inneren Auskleidung (1) und der äußeren Verbundstoffhülle (2) angeordnet ist, wobei der Kragen in einem Teil seines Innendurchmessers mit einer Aussparung versehen ist,
   - eine ringförmige Scheibe (5) mit einer Form, die in die Aussparung des kreisförmigen Kragens passt,
   - einen kreisförmigen Stöpsel (6) mit einer zentralen Öffnung, die mit einem Gewinde versehen ist, das zum Eingreifen in ein Ventil oder eine Armatur geeignet ist, und wobei die äußere Oberfläche des Stöpsels (6) einen ersten Abschnitt umfasst oder die Fläche, die sich am nächsten nach außen an der Öffnung des Einlass/Auslasssystems befindet (3), einen an den ersten Abschnitt angrenzenden zweiten Abschnitt und einen an den zweiten Abschnitt angrenzenden dritten Abschnitt, wobei der erste Abschnitt eine umlaufende Aussparung umfasst, wobei der zweite Abschnitt mit einem Befestigungsmittel versehen ist, um dies zu gewährleisten druckbelastbaren Fixierung des Stöpsels (6) im Druckbehälter, und das dritte Teil mindestens eine Nut zum Einsetzen eines Dichtelements (7) aufweist,

   dadurch gekennzeichnet, dass

   - die Aussparung im Kragen grenzt an die äußere Verbundstoffhülle;
   - der kreisförmige Kragen (8) und die ringförmige Scheibe (5) so konfiguriert sind, dass sie mit der Innenfläche der äußeren Verbundstoffhülle (2)

zusammenwirken, und
- der dritte Teil des Stöpsels (6) einen größeren Durchmesser als der zweite Teil des Stöpsels (6) hat, wodurch das Befestigungsmittel gebildet wird; die ringförmige Scheibe (5) grenzt an den zweiten Teil des Stöpsels (6); die Aussparung im ersten Teil des Stöpsels (6) einen kleineren Durchmesser als der zweite Teil des Stöpsels (6) hat und die Endteile der äußeren Verbundstoffhülle (2) aufnimmt.

2. Verbunddruckbehälter nach Anspruch 1, **dadurch gekennzeichnet, dass** das Einlass/Auslasssystem mit einem Beschriftungsring (4) ausgestattet ist.

3. Verbunddruckbehälter nach Anspruch 1 oder 2, wobei die innere Auskleidung (1) aus Metall, wie Stahl, oder aus Polymermaterial, wie Polyethylen oder Polyethylenterephtalat, hergestellt ist.

Revendications

1. Récipient sous pression composite comprenant un revêtement interne (1), une coque externe (2) composite ayant une surface interne et une surface externe, et comprenant un système d'entrée/sortie (3), où le système d'entrée/sortie (3) comprend

- une collerette (8) circulaire située circonférentiellement entre le revêtement interne (1) et la coque externe (2) composite, ladite collerette étant pourvue d'un évidement dans la partie de son diamètre interne,
- un disque (5) annulaire ayant une forme qui s'insère dans l'évidement de la collerette circulaire,
- un bouchon (6) circulaire avec une ouverture centrale pourvue d'un filetage adapté pour engager une vanne ou un raccord, et où la surface extérieure du bouchon (6) comprend une première partie ou la surface située la plus proche de l'ouverture du système d'entrée/sortie (3) vers l'extérieur, une deuxième partie adjacente à la première partie, et une troisième partie adjacente à la deuxième partie, où la première partie comprend un évidement circonférentiel, la deuxième partie est pourvue d'un moyen de fixation pour assurer la fixation du bouchon (6) dans le récipient et lui permettant de résister à la pression, et la troisième partie comporte au moins une rainure pour l'insertion d'un élément d'étanchéité (7),

caractérisé en ce que
- l'évidement de la collerette est adjacent à la coque externe composite ;
- la collerette (8) circulaire et le disque (5) annulaire sont configurés pour coopérer avec la surface interne de la coque externe (2) composite, et
- la troisième partie du bouchon (6) a un diamètre supérieur à celui de la deuxième partie du bouchon (6), formant ainsi les moyens de fixation; le disque (5) annulaire est accolé à la seconde partie du bouchon (6); l'évidement de la première partie du bouchon (6) a un diamètre inférieur à celui de la seconde partie du bouchon (6), et reçoit les parties d'extrémité de la coque externe (2) composite.

2. Récipient sous pression composite selon la revendication 1, où le système d'entrée/sortie est équipé d'une bague de repérage (4).

3. Récipient sous pression composite selon la revendication 1 ou 2, où le revêtement interne (1) est en métal, tel que l'acier, ou en matériau polymère, tel que le polyéthylène ou le polyéthylène téréphtalate.

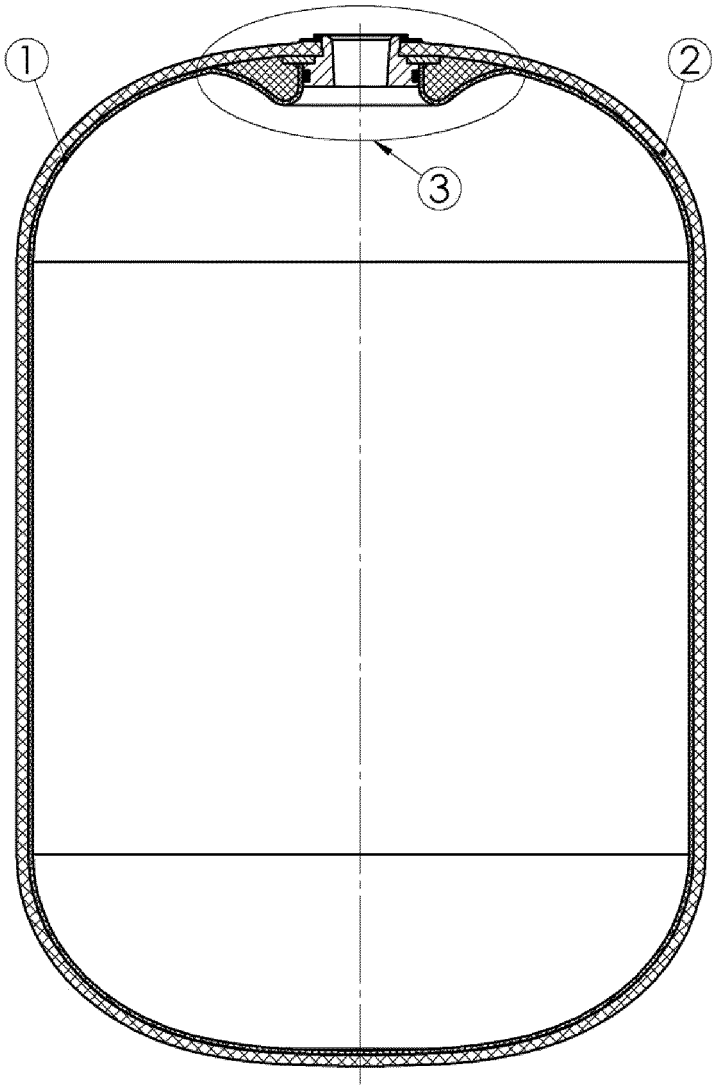

Fig. 1

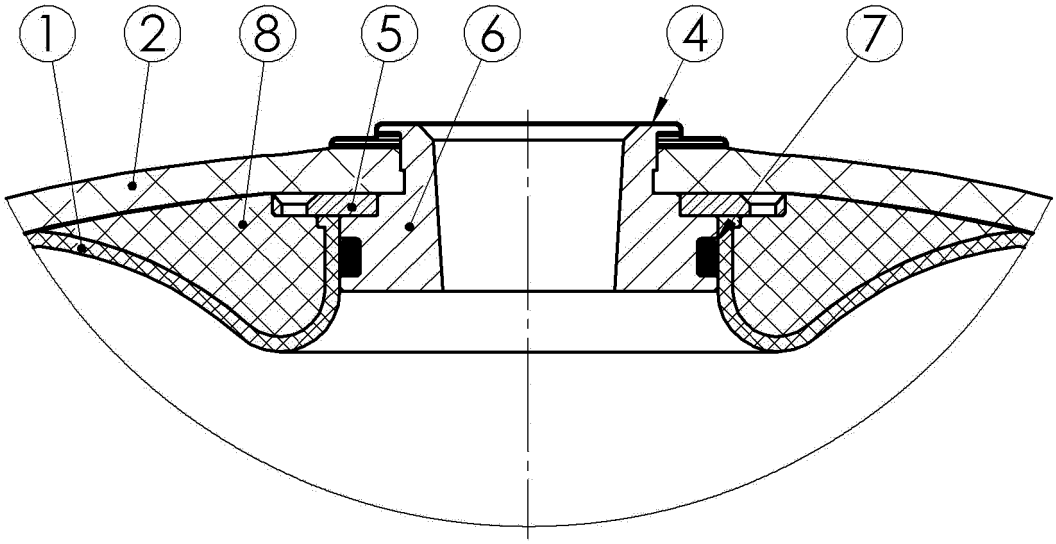

Fig. 2

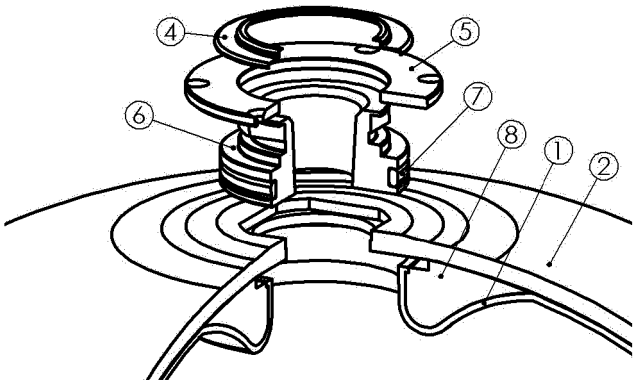

Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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