

## A FLOWABLE BULK MATERIAL CONTAINER

**THIS INVENTION** relates to a flowable bulk material container.

The invention relates particularly to a flowable bulk material container that is provided for containing a flowable bulk material such as a liquid, a particulate material, and the like. A particular known form of a flowable bulk material container as herein envisaged is commonly referred to in the trade as a Flexible Intermediate Bulk Container (FIBC) and any reference hereinafter to a flowable bulk material container must be interpreted as a reference to a container of the type known as a FIBC.

A flowable bulk material container as herein envisaged comprises a container part which is formed of a flexible sheet material, typically a woven synthetic plastics material, the container part optionally including a multi-layered construction in order to accommodate particular applications, or to provide the bag with required qualities, e.g. waterproof qualities. The container part is formed of one or more sheet material segment which, in the filled configuration of the container part, provides for the container part with its contents to form a substantially square or rectangular six-sided body, the container part thus defining, in the filled configuration thereof, a top wall, a bottom wall and two pairs of substantially parallel, spaced side walls extending between the top wall and the bottom wall. This configuration of a flowable bulk material container clearly permits stacking of the container parts thereof, when filled with a flowable bulk material, on one another for storage and transport purposes. Either one or both of the top wall and the bottom wall of

the container part optionally may be associated with an opening arrangement for facilitating filling of the container part with a flowable material and/or discharge of a flowable material from the container part.

- 5 Any reference hereinafter to a flowable bulk material container must be interpreted as a reference to a container of the above general type, being of a type also commonly known as a FIBC, and of which the container part forms a substantially square or rectangular body in its filled configuration, the specific construction of such a container being greatly variable.

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A known flowable bulk material container as herein envisaged further is provided with lifting loops that are defined by strap elements that are stitched to the container part in different configurations, particularly in the corner regions or across the corners of the container part, the lifting loops being engageable by the two forks of a forklift to permit  
15 lifting and displacement of the container.

It is well known that the above arrangement of lifting loops as defined by strap elements require extreme care to be taken when passing the forks of a forklift therethrough, both to ensure proper positioning of the loops on the forks and to ensure that the material  
20 defining the loops, i.e. the strap elements, are not "cut" by the edges of the forks. Incorrect positioning of the lifting loops on the forks also can result in "peel" forces to act between the strap elements defining the loops and the container part of the flowable bulk material container, instead of only tensile forces, peel forces being dangerous insofar as these forces can result in the strap elements defining the loops to be "pulled" from the  
25 container part. Picking up a flowable bulk material container with a forklift is thus labour intensive, particularly insofar as the driver of the forklift requires assistance with the positioning of the lifting loops of the container on the forks of his forklift.

It is thus an object of this invention to provide a flowable bulk material container which  
30 includes a lifting loop arrangement which permits engagement with the forks of a forklift in a less labour intensive manner and particularly a manner in which it will not be

associated with the problems identified above in relation to known flowable bulk material containers.

According to the invention there is provided a flowable bulk material container, which  
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a container part that is formed of a flexible sheet material and that defines, in the operative filled configuration thereof, a base wall, two pairs of substantially parallel spaced side walls and a top wall, the top wall being defined by an extension segment of  
10 material, formed by extensions of the side walls extending beyond the operative top ends of the respective side walls, that is folded to form the top wall by displacing end segments of one of the respective side wall extensions of one of the pairs of side walls together, with end segments of the respective side wall extensions of the other pair of side walls being folded between them, the extension segment thereby forming the top  
15 wall with all the end segments projecting from the top wall midway between and parallel to the pair of side walls of the container part of which end segments of the side wall extensions are displaced together; and

at least one pair of strap elements that is attached to the end segments of the  
20 side wall extensions forming the extension segment in a configuration in which each one of the end segments of the side wall extensions that are displaced together and each adjacent end segment part of the other side wall extensions are attached to one another by an end of a strap element and the two strap elements of the pair thereby define opposing lifting loops that extend from the end segments and that permit simultaneous  
25 engagement by a fork of a forklift.

One particular embodiment of the container of the invention includes one pair of strap elements and for this embodiment the lifting loops defined by the strap elements are centrally located between opposite ends of the end segment of the side wall extensions  
30 displaced together, each end of each strap element being secured to its one of the end

segments of the side wall extensions that are displaced together and one of the end segment parts of the other two side wall extensions adjacent thereto.

5 A second particular embodiment of the container of the invention has two pairs of strap elements and for this embodiment, the free ends of each strap element is secured to its one of the two end segments of the side wall extensions that are displaced together and the same end segment part of the other side wall extensions adjacent thereto.

10 For this latter embodiment of the container of the invention, each pair of strap elements define a pair of opposing lifting loops with the two pairs of opposing lifting loops being equally spaced from the centre of the end segments of the side wall extensions that are displaced together. Also, the ends of each strap element attached to the end segments of side wall extensions may be positioned either on top of one another or adjacent one another. Still further, the corner regions of the end segments of the side wall extensions  
15 that are displaced together and their respective adjacent end segment parts of the other side wall extensions may be folded over and have the ends of each strap element attached thereto in the folded over part thereof. Thereby, the regions between the strap elements and the side walls of the container part of the container are effectively blocked, while the strength qualities of the container also are enhanced.

20 Further according to the invention, the ends of the strap elements may be attached to the end segments of the side wall extensions forming the extension segment of the container part by means of stitching, although it is envisaged also that the strap elements may be attached by any alternative means or process, e.g. with the use of an  
25 adhesive, heat welding, or the like. Also, the ends of the strap elements attached to the end segments of the side wall extensions forming the extension segment of the container part may be positioned perpendicularly to the general plane of the bottom wall of the container part, in the filled configuration of the container part and in the configuration of the strap elements in which they define lifting loops that are engaged  
30 with the forks of a fork lift.

For both the above embodiments of the invention, in a configuration thereof in which each pair of lifting loops is displaced away from one another, the end segments of the side wall extensions forming the extension segments may provide for the formation of an opening through which filling of material into, and discharge of material from, the container part can take place. Particularly for a container that includes two pairs of strap elements and where the strap elements forming the pairs of lifting loops are located near the respective ends of the end segments of the side wall extensions that are displaced together, each end segment of each one of the side wall extensions that are displaced together and each adjacent end segment of the other side wall extensions may be stitched together towards a spaced location from the centre of the container to define an opening in the centre region of the top wall of the container. The side wall extensions in the region where the end segments thereof are stitched together may be profiled to form an inverted funnel-type formation with the opening defined in the centre thereof.

The opening defined in the top wall of the container of the invention may include a closure arrangement for closing the opening.

Still further, each pair of strap elements of the container of the invention may be associated with a tying element for releasably tying together the opposing lifting loops defined thereby. As such, engagement of the lifting loops defined by each pair of strap elements by the forks of a forklift can be facilitated.

It must be appreciated also that the container of the invention may be associated with any alternative filler means, either on the operative top or bottom side thereof, or elsewhere.

The effective length of the strap elements and particularly also the effective length of the end segments of the side wall extensions that form the extension segment of the container part of the container to which the strap elements are secured is greatly variable, this effective length being determined particularly by the strength requirements of the associated container. Still further, the length of the strap elements clearly will

ensure that the lifting loops defined by the strap elements can be conveniently engaged by the forks of a forklift. Also, the exact mode of attaching the strap elements will be such that during the lifting of the container with a forklift that engages the lifting loops defined, the lifting loops in relation to their configuration with respect to the container part of the container will be exposed to tensile forces only, which results in the configuration of the container as above defined.

It will be appreciated that within the principles above defined, the exact configuration of the flowable bulk material container of the invention is greatly variable and the invention extends also to each such variation of a flowable bulk material container which still incorporates the said principles. Still further, the flowable bulk material container of the invention may be associated with any additional features that are commonly associated with known flowable bulk material containers, particularly such containers that are commonly referred to as FIBCs.

The features of the invention are described in more detail hereafter with reference to two examples of flowable bulk material containers that are illustrated in the accompanying diagrammatic drawings. In the drawings:

Figure 1 shows a three-dimensional view of a first embodiment of a flowable bulk material container, in accordance with the invention;

Figure 2 shows a plan view of the container of Figure 1;

Figure 3 shows a front view of the container of Figure 1;

Figure 4 shows a side view of the container of Figure 1;

Figure 5 shows a plan view of a second embodiment of a flowable bulk material container, in accordance with the invention;

Figure 6 shows a front view of the container of Figure 5; and

Figure 7 shows a side view of the container of Figure 5.

5 Referring initially to Figures 1 to 4 of the drawings, a first embodiment of a flowable bulk material container, particularly a container of the type also known as a FIBC, is designated generally by the reference numeral 10. The container 10 is illustrated in its filled configuration and it must be appreciated in this regard that the container is formed of a synthetic plastics sheet material of a type conventionally used for FIBCs, e.g. a  
10 woven polypropylene material and, as such, that the container 10 in practice will not define sharp corners as illustrated, or planar walls as illustrated, the sharp corners and planar walls being illustrated as such merely for the sake of illustration.

When in its filled configuration as shown, the container 10 includes a container part 12  
15 which is filled with a flowable bulk material and which, in combination with the bulk material, forms a six sided body. The container part thus defines a bottom wall 14, a top wall 16, a first pair of substantially parallel opposing side walls 18 and a second pair of substantially parallel opposing side walls 20.

20 Except for the construction of the top wall 16 of the container part 12, the construction of the container part is equivalent to that of the container parts of known FIBCs which, it is known, is greatly variable. The container part 12 as shown particularly is made up of a single material segment that is suitably formed, although it can be made up also of a plurality of material segments suitably stitched together. It is also envisaged that the  
25 container part 12 may be a multi-layered structure, in order to provide the container with particular strength qualities and other properties. The general construction of the container part 12 of the container 10 is thus not described in further detail herein.

The top wall 16 of the container part 12 of the container 10 is formed by a folding  
30 process carried out on an extension segment of material, the extension segment 22 particularly being formed by extensions of the side walls, 18 and 20, from their operative

top ends, as illustrated. The top wall 16 particularly is formed by displacing end segments of the pair of side wall extensions extending from the side walls 18 together, with corresponding end segments 26 of the other pair of side wall extensions extending from the side walls 20 being folded between them (see Figures 1 and 2 of the drawings).

5 The extension segment 22 thereby forms the top wall 16, as well as end segments, 24 and 26, projecting from the top wall 16 midway between and parallel to the pair of side walls 18 of the container part 12, as is clearly illustrated. The side wall extensions that are displaced together in the drawings are shown partially spaced from one another, for the sake of clarity. With these side wall extensions displaced together, the top end of the  
10 container part 12 of the container 10 is effectively closed and with the end segments, 24 and 26, then folded onto the top wall 16, similar containers can be conveniently stacked upon one another for transport and storage purposes.

In the configuration of the container 10 in which it is to be displaced by means of a  
15 forklift, as described hereafter, the end segments, 24 and 26, of the extension segment 22 will extend perpendicularly to the general plane of the bottom wall 14 and the top wall 16 of the container 10, as is illustrated in particularly Figures 1 and 4 of the drawings. The end segments, 24 and 26, of the extension segment 22 has two pairs of strap elements attached thereto, each strap element of one pair being indicated by the  
20 numeral 30 and each strap element of the other pair being indicated by the numeral 32. Each strap element, 30 and 32, has its opposite ends attached to the extension segment in the region of the end segments, 24 and 26, typically by stitching. More particularly and in relation particularly to the strap element 30.1, the free ends 34 of this strap element 30.1 lie on top of one another and are stitched to both the end segment 24.1 and the  
25 adjacent end segment part of an end segment 26. Each strap element, 30 and 32, is similarly attached, so that each end segment 24 has one strap element of each pair attached thereto. Stitch lines for the respective strap elements are illustrated by dotted lines.

30 As is clear from particularly Figures 1 and 3 of the drawings, each end segment 24 also is stitched to an adjacent end segment part 26 to a location spaced from the centre of

the end segments 24 (see dotted lines 36). As such, by displacing the end segments 24 away from one another, an opening 38 is defined that leads into the container part 12 to permit charging of bulk material into the container part 12, as well as discharging of material therefrom.

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Particularly in the configuration of the container 10 as shown in Figure 1, with the opening 38 fully opened, the end segments 24 and 26 of the extension segment 22 are profiled to define an inverted funnel-shaped configuration within which a closure arrangement (not shown) may be located for effectively closing the opening 38 during

10 handling and transport of the container 10.

With the strap elements being formed of a suitable flexible material, particularly a material of the type used for the strap elements of FIBCs, it will be understood that each pair of strap elements, 30 and 32, can be conveniently manipulated to define aligned

15 loops through which the respective forks of a forklift can pass. It is envisaged in this regard also that the strap elements of each pair can be suitably tied together by a tying element (not shown) in a configuration in which the loops defined thereby are aligned to facilitate engagement by the respective forks of a forklift.

As is clear from the drawings, the segments of the strap elements that are stitched to the end segments of the extension segment 22 are disposed substantially perpendicularly to the free edge of the end segments 22, i.e. substantially perpendicularly to the bottom wall of the container part of the container 10 when filled with a bulk material. This ensures that during lifting of the container with a forklift, only tensile forces act on the

25 lifting loops and particularly also on the end segments, 24 and 26, of the extension segment 22, as described.

It is submitted that the mode of engagement of the loops defined by the strap elements, 30 and 32, by the respective forks of a forklift will be significantly less labour intensive

30 when compared with the engagement of the lifting loops of known containers of the type, while the configuration of the lifting loops with respect to the end segments, 24 and 26,

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provide for tensile forces only to act on the end segments, the load carrying qualities of the container 10 thus being enhanced when compared with the load carrying qualities of known containers. The above applies both to the actual mode of attachment of the strap elements to the container part of the container and to the forces acting on the container part as a result of the container being suspended from the forks of a forklift.

The container 10 also may be associated with any other features commonly associated with known FIBCs, both in relation to overall configuration, the configuration and location of charge openings and discharge openings, the types of material used in order to provide the container with desired qualities, and the like.

Particularly in relation to the location of the strap elements, 30 and 32, with respect to the end segments, 24 and 26, it must be understood that the free ends 34 of the strap elements also may be positioned adjacent one another, as opposed to being positioned upon one another as shown, such positioning providing for an effective twist in each strap element that can facilitate the alignment of the loops defined by the respective pairs of strap elements for engagement by the respective forks of a forklift. The end profile of the end segments, 24 and 26, also is variable in order to provide for different configuration openings 38 to be defined.

Referring now to Figures 5 to 7 of the drawings, a second embodiment of a flowable bulk material container, in accordance with the invention, is designated generally by the reference numeral 50. The overall construction of the container 50 is essentially the same as that of the container 10 and like parts are designated by the same reference numerals as before. The container 50 particularly only has two strap elements 52, forming a single pair of strap elements, the free ends 54 of the strap elements again being each secured to one end segment 24 and an adjacent end segment 26 of an extension segment 22, as illustrated. The ends 54 of the strap elements particularly are located at an equal spacing from the operative mid-way point between the opposite ends of the end segments 24 to which they are attached, thus forming two loops that directly oppose one another and that can be conveniently engaged by a single fork of a forklift

for lifting and manipulation of the container. Also, by displacing the strap elements apart and thereby displacing the end segments 24 and attached end segments 26 apart, an opening 54 is defined that can provide for charging of bulk material into the container 50 and discharging of bulk material therefrom. It will be understood that the overall configuration of the strap elements 52 forming the lifting loops of the container 50 in relation to their attachment to the end segment 22 of the container 50 is the same as before, thus being associated with equivalent benefits in respect of the use of the container, i.e. in relation to the engagement of the lifting loops thereof by a fork of a forklift and the load carrying qualities provided by the strap elements. As illustrated in Figure 7 of the drawings, the two strap elements 52 can again be conveniently tied together, e.g. by a tying element 56, thus serving the purpose both of holding closed the bag 50, while also holding the loops defined by the strap elements in an aligned configuration that renders them easily engageable by the fork of a forklift.

Once again, the exact configuration of the container 50 is greatly variable, both in relation to overall construction, material used for forming the container part of the bag, and the like.

The invention extends also to all variations of the bags 10 and 50 as described and which still incorporate the essential features of the present invention as herein defined and described.

CLAIMS

## 1. A flowable bulk material container, which includes

5 a container part that is formed of a flexible sheet material and that defines, in the operative filled configuration thereof, a base wall, two pairs of substantially parallel spaced side walls and a top wall, the top wall being defined by an extension segment of material, formed by extensions of the side walls extending beyond the operative top ends of the respective side walls, that is folded to form  
10 the top wall by displacing end segments of one of the respective side wall extensions of one of the pairs of side walls together, with end segments of the respective side wall extensions of the other pair of side walls being folded between them, the extension segment thereby forming the top wall with all the end segments projecting from the top wall midway between and parallel to the pair of side walls of the container part of which end segments of the side wall extensions are displaced together; and

at least one pair of strap elements that is attached to the end segments of the side wall extensions forming the extension segment in a configuration in which  
20 each one of the end segments of the side wall extensions that are displaced together and each adjacent end segment part of the other side wall extensions are attached to one another by an end of a strap element and the two strap elements of the pair thereby form opposing lifting loops that extend from the end segments and that permit simultaneous engagement by a fork of a forklift.

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2. A container as claimed in Claim 1, that has one pair of strap elements, the lifting loops defined by the strap elements being centrally located between opposite ends of the end segments of the side wall extensions displaced together, each end of each strap element being secured to its one of the end segments of the side wall extensions that are displaced together and one of the end segment  
30 parts of the other two side wall extensions adjacent thereto.

3. A container as claimed in Claim 1, that has two pairs of strap elements, the free ends of each strap element being secured to its one of the two end segments of the side walls extensions that are displaced together and the same end segment part of the other side wall extensions adjacent thereto.
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4. A container as claimed in Claim 3, in which each pair of strap elements define a pair of opposing lifting loops with the two pairs of opposing lifting loops being equally spaced from the centre of the end segments of the side wall extensions that are displaced together.
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5. A container as claimed in Claim 3 or Claim 4, in which the ends of each strap element attached to the end segments of side wall extensions are positioned on top of one another.
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6. A container as claimed in Claim 3 or Claim 4, in which the ends of each strap element attached to the end segments of side wall extensions are positioned adjacent one another.
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7. A container as claimed in any one of Claims 3 to 6, in which the corner regions of the end segments of the side wall extensions that are displaced together and their respective adjacent end segment parts of the other side wall extensions are folded over and have the ends of each strap element attached thereto in the folded over part thereof.
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8. A container as claimed in any one of the preceding claims, in which the ends of the strap elements are attached to the end segments of the side wall extensions forming the extension segment of the container part by means of stitching.
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9. A container as claimed in any one of the preceding claims, in which the ends of the strap elements attached to the end segments of the side wall extensions forming the extension segment of the container part are positioned

perpendicularly to the general plane of the bottom wall of the container part, in the filled configuration of the container part and in the configuration of the strap elements in which they define lifting loops that are engaged with the forks of a forklift.

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10. A container as claimed in any one of the preceding claims, in which, in a configuration in which each pair of lifting loops is displaced away from one another, the end segments of the side wall extensions forming the extension segment provide for the formation of an opening through which filling of material into, and discharge of material from, the container part can take place.

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11. A container as claimed in Claim 10, insofar as the container includes two pairs of strap elements, in which the strap elements forming the pairs of lifting loops are located near the respective ends of the end segments of the side wall extensions that are displaced together and in which the end segment of each one of the side wall extensions that are displaced together and each adjacent end segment of the other side wall extensions are stitched together towards a spaced location from the centre of the container to define an opening in the centre region of the top wall of the container.

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12. A container as claimed in Claim 11, in which the side wall extensions in the region where the end segments thereof are stitched together are profiled to form an inverted funnel-type formation with the opening defined in the centre thereof.

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13. A container as claimed in any one of Claims 10 to 12, in which the opening defined incorporates a closure arrangement for closing the opening.

14. A container as claimed in any one of the preceding claims, in which each pair of strap elements are associated with a tying element for releasably tying together the opposing lifting loops defined thereby.

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15. A flowable bulk material container substantially as described in the specification with reference to and as illustrated in the accompanying drawings.