

Flexible Container and Filling Device For Such a Flexible Container and Corresponding Filling Method

The invention relates to a flexible container and to a filling device for such a flexible container and a corresponding filling method having the features according to the preambles of patent claims 1, 7 and 8, respectively.

A device for guiding plastic sacks at a filling station is known from G 88 05 713, which, however, fails to take into account, or at least does not satisfactorily take into account, a vacuum often prevalent in a process unit to be connected to the container.

The filling process of a flexible container from a process unit to which a vacuum is applied fails, in that no material falls into the flexible container, because known containers collapse as soon as the vacuum is present. For this reason, to date flexible containers are not used in such case or can only be used at great cost and effort.

Thus, the problem underlying the invention is to propose a flexible container for connection to a process unit operating with a vacuum, if possible also a suitable filling method and an advantageous filling device.

The problem is solved according to the invention by means of a flexible container comprising the characterizing features according to Claim 1, a filling device according to Claim 7 and a filling method comprising the characterizing method features of Claim 8.

Advantageous embodiments are specified in the dependent claims.

The flexible container and the process unit comprise chambers opening into one another, to which a vacuum is applied. The flexible container according to the

invention includes a receptacle for a support apparatus and/or the support apparatus itself in or on the wall of the container.

The support apparatus assumes at least in this region, and in advantageous embodiments far into the inside of the container, a support function from the inside to the outside, and counteracts the otherwise imminent collapse.

According to one exemplary embodiment of the container according to the invention, the receptacle for the support apparatus extends in the circumferential direction and/or in the axial direction, viewed from a perspective having an axial direction oriented in the filling direction.

According to another advantageous embodiment of the container according to the invention, the support apparatus is an elongated pipe socket, around which the flexible container is gathered. In this arrangement, the entire container accommodates the support apparatus.

According to another advantageous embodiment of the container according to the invention, the receptacle for the support apparatus extends in pockets formed in or on the wall.

According to another advantageous embodiment of the container according to the invention, the wall is designed at least in sections as a double wall. The wall is intended to accommodate the support apparatus between an inner wall and an outer wall.

According to another advantageous embodiment of the container according to the invention, the pockets are formed by welding sections of the inner wall to the outer wall in the circumferential direction or radial direction.

A filling device according to the invention for such a flexible container is equipped with a support apparatus, which can be accommodated in the flexible container.

A filling method according to the invention for such a flexible container includes the following method features. The container may be connected to a process unit operated with a vacuum, and a support apparatus holds the container open against the forces of the vacuum acting inwardly on the wall of the container.

The invention is explained in greater detail below with reference to two exemplary embodiments depicted in the drawings. The depictions schematically show the structure and allow views at least sectionwise into the inside of the components, in which:

Fig. 1 shows a schematic side view of a first exemplary embodiment of a flexible container according to the invention, which is connected to a process unit for filling according to a filling method according to the invention and is accommodated in a filling device according to the invention,

Fig. 2 shows the container from Fig. 1 in a schematic top view, and

Fig. 3 shows a schematic axial section through a second exemplary embodiment of a container according to the invention.

Figures 1 and 2 are to be understood, in principle, as a side view (Fig. 1) and a top view (Fig. 2) depicted in accordance with drafting standards (projection rule).

Figures 1 and 2 show a first exemplary embodiment of a container 10.1 according to the invention, which is connected at the top to a process unit 20, to which a vacuum is applied, and at the base is accommodated in a filling device 30.

In this arrangement, the flexible container 10.1 according to the first embodiment encompasses a first support apparatus 30.3 at the top, namely, a pipe socket of the process unit 20 designed of sufficient length, which protrudes further than normal into the inside of the container. The solution to the connection problem, in which reciprocally interlocking plastic closure strips are used, is particularly advantageous.

The base of the flexible container according to the first exemplary embodiment includes axial pockets 16.1, i.e. oriented along a filling direction E, which accommodate rods of a second support apparatus 30.1, which are distributed over the circumference of the container. The pockets 16.1 are formed inside the wall 14.1. For this purpose, the wall 14.1 includes an inner well, especially clearly visible in Fig. 2, which may also be referred to as an inner container, and an outer wall 19.1, which may be a section of tubular film disposed on the outside. The walls 18.1, 19.1 are welded together along axial lines. Preferably, polyethylene films are combined with one another.

Figure 3 depicts likewise schematically and corresponding more to an axial section, a second exemplary embodiment of a flexible container 10.2 according to the invention. Chamber 12 to be filled in the filling direction E is braced in the circumferential direction by the support apparatus 30.2 disposed here. For this purpose, the support apparatus 30.2, as part of the container 10.2, is disposed in circumferential, in particular, spiral-shaped, circumferential pocket(s) 14.2.

When manufacturing a container according to the second exemplary embodiment, it is possible in the case of the spiral-shaped configuration to weld the inner wall 18.2 continuously to the outer wall 19.2.

Claims:

1. A flexible container (10.1; 10.2) for sealed connection to a process unit (20), wherein a vacuum is applied to chambers (12, 22) opening into one another comprising at least partial volumes of the process unit and the container, characterized in that a receptacle for a support apparatus (30.1; 30.2; 30.3), or the support apparatus itself (30.2), is disposed in or on the wall (14.1; 14.3) of the container 10.1; 10.2).
2. The flexible container according to Claim 1, characterized in that the receptacle for the support apparatus (30.1; 30.2; 30.3) extends in the circumferential direction and/or in the axial direction, viewed from a perspective having an axial direction oriented in the filling direction (E).
3. The flexible container (10.1) according to one of Claims 1 or 2, characterized in that the support apparatus (30.3) is an elongated pipe socket, around which the flexible container (10.1) can be gathered as a receptacle.
4. The flexible container (10.1; 10.2) according to one of Claims 1 or 2, characterized in that the receptacle for the support apparatus (30.1; 30.2) extends in pockets (16.1; 16.2), which are formed in or on the wall (14.1; 14.2).
5. The flexible container (10.1; 10.2) according to one of Claims 1, 2 or 4, characterized in that the wall (14.1; 14.2) is designed at least in sections as a double wall, and that the wall (14.1; 14.2) is intended to accommodate the support apparatus (30.3) between an inner wall (18.1; 18.2) and an outer wall (19.1; 19.2).
6. The flexible container (10.1; 10.2) according to Claims 4 and 5, characterized in that

the pockets (16.1; 16.2) are formed by welding sections of the inner wall (18.1; 18.2) to the outer wall (19.1; 19.2) in the circumferential direction or radial direction.

7. A filling device (30) for a flexible container (10.1; 10.2) having a support apparatus (30.1), which may be accommodated in a flexible container (10.1) according to one of the preceding claims.

8. A filling method for a flexible container (10.1; 10.2) according to one of Claims 1 through 6, in which the container (10.1; 10.2) can be connected to a process unit operated with a vacuum, characterized in that a support apparatus (30.1; 30.2; 30.3) holds the container (30.1; 30.2; 30.3) open against the forces of the vacuum acting inwardly on the wall (14.1; 14.2) of the container (10.1; 10.2).