PROTECTIVE DEVICE FOR THE COVERING OF FLANGES FOR PIPE CONSTRUCTION

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Publication Classification

Int. Cl.
B65D 59/06

U.S. Cl. .................................................. 138/96 R

ABSTRACT

A protective device 1 exhibits an insert 3 for connection to a welding flange neck 2 for pipe construction. The protective device 1 is furthermore equipped with a disc 4 disposed around this insert 3 for the covering of a partial surface 5 and/or a sealing surface 7 of the welding flange neck 2. The insert 3 is dimensioned in this case corresponding to the flange hole 6 of the welding flange neck 2 and exhibits in addition a resilience 8.
The invention relates to a protective device for welding flange necks for pipe construction having a disc for the covering of a partial surface of the welding flange neck and having transversely disposed to said disc an insert via which the disc is releasably connected to the welding flange neck wherein the insert is provided with a resilient connection to the welding flange neck by means of a clamping connector.

Welding flange necks are used in pipe construction for the connection of pipes and pipe sections. The welding flange necks are connected by means of welding to the respective pipe or pipe section. In the mechanical processing of flanges and/or pipes e.g. by means of glass-, sand- or shot-blasting it is necessary to protect partial surfaces of said flange from impurities and particularly from the penetration of blasting medium. In order to protect said surfaces, also described as sealing surfaces, they are covered during the processing by means of adhesive tape or film. A substantial disadvantage of the use of said adhesive solutions however is that the adhesion is very time consuming and also imprecise. Our invention may be distinguished from the proposed solutions in that the disc is embodied in the form of the clamping seating between the hole and the insert. This is embodied such that a specific partial surface can be covered at all times and an optimum fit and grip is guaranteed with the sealing surface of the flange. This is the case irrespective of the respectively concrete shape and dimensions of the welding flange neck because the resiliently embodied insert can adjust itself accordingly.

From several respects it is beneficial that the disc exhibits at least one centrally extending bead or indent on its side facing the flange. By means of this reinforcement which extends circumferentially through 360° on the underside of the disc the danger of the cover buckling is minimised and also an improved force absorption of the blasting medium is guaranteed. At the same time it is possible to fill the cavities present on the underside of the cover with a medium, e.g. grease, such that no colour pigments can deposit onto the sealing surface during painting. Along with a stiffening function this bead or indent also performs the function of forming a type of isolated space in its interior for the accommodation of a medium.

Reference has already been made to the fact that it is particularly conceivable that the disc is embodied corresponding to a sealing surface provided on the welding flange neck which sealing surface requires separate protection against the penetration of impurities during the blasting process. The transversely with respect to the insert disposed disc extends on the side facing the welding flange neck of the protective arrangement also described as a stopper around the hole provided in the flange. Because the disc is embodied and disposed corresponding to said sealing surface it coincidentally automatically covers the seal in conjunction with the measures to be described later when the resiliently embodied insert is inserted into the flange hole and secured there by means of a clamping seating.

In this context it is provided that the insert exhibits at least one substantially cylindrical basic form. The form and size of said cylinder shall be dimensioned in this case such that when pushing the insert into the hole of the flange the corresponding clamping seating is guaranteed.

A preferred variant of the invention provides that the protective device is made of a plastic having a density $\geq 1$ kg/m$^3$. With this material can be implemented a dimensionally stable and sufficiently robust beneficially one-piece blasting stopper which permits the positively-engaging covering of the sealing surface in order to prevent its mechanical damage. The blasting stopper made of a plastic having a density of $\geq 1$ kg/m$^3$ can also withstand eventual powder coating and the associated heating effect. At the same time the abrasion during blasting is minimised and it is possible to process the flange to be blasted automatically by means of a blasting system.

A substantial component of the invention is the resiliently-formed insert. In this respect it is conceivable for the insert to exhibit openings to serve as a resilience which lead to a specific yielding capability of the insert and which, in the event of its insertion into the flange hole, guarantee the clamping seating.

In this regard it is proposed that the resilience is formed by openings extending parallel with respect to the longitudinal axis of the insert also in order to achieve the corresponding yielding capability.
For example it is conceivable that the openings are embodied as notches or in other words as a kind of removed triangle in the insert whose extensions tip in the direction of the disc.

One variant provides to this end that the openings are embodied as slits which extend parallel with respect to the axis of the insert.

A certain malleability is additionally achieved if the openings are embodied as slits with rounding-offs to avoid breaking or tearing of the plastic. The rounding-offs are also positioned in the direction of the disc in the region of the inserts.

It is additionally proposed that the openings extend to the end of the insert facing the disc. In other words the insert is then formed by means of several separately disposed edge clips which extend individually perpendicularly with respect to the plane of the disc. Thereby the yielding capability at the end of the insert facing the disc is particularly great and may decrease in the direction of the disc. In this manner the insert can secure itself to a certain extent on placement of the blasting stopper on the flange.

It is furthermore provided that the edge clips exhibit curvatures on their outer sides which additionally serve for better fixture. The edge clips are embodied for this purpose with inconstant thickness. Furthermore they preferably exhibit in their centre an outwardly-inclined curvature which simplifies the fixing of the insert and thereby of the blasting stopper.

An alternative to this provides that the edge clips exhibit webs on their outsides which webs improve the clamping effect. The actual edge clip is therefore at least approaching constant thickness in the case of this variant while however individual webs are disposed on the outside of the edge clips preferably parallel with respect to the disc, which individual webs are intended to improve the clamping effect.

It is further judicious for the bead to extend to the outer edge of the disc such that when looking from the outside in there is as much space as possible to accommodate such a medium.

Furthermore the disc should also be provided with a plurality of preferably concentrically-progressing beads, preferably two beads. Eight and more concentrically-progressing beads are also conceivable. Thereby is firstly achieved an even better variant of a reinforcement and secondly several chambers are coincidentally formed for the accommodation of a medium.

After the mechanical processing of the flange the blasting stopper can also remain in its position as flange protection until it is finally removed at the subsequent place of use. Removal in this case can be manually by turning and extracting or by a comparable tool provided the disc exhibits at least one pulling arrangement on its side facing away from the flange. Primarily by means of this embodiment and arrangement of the disc as well as the insert makes a residue-free removal of the blasting stopper possible such that the sealing surface need not be cleaned with solvents or time-consuming mechanical processes.

A further concrete proposal for the removing of the protective device provides that the pulling means comprises at least one and preferably two oppositely disposed lugs. Ultimately however up to 16 lugs serving as a pulling means are conceivable.

The invention is particularly characterised in that a one-piece blasting stopper is created as a protective device for welding flange necks for pipe construction which guarantees effortless handling at any time in many respects. Thus firstly the fixing of the blasting stopper in the welding flange neck is particularly easy wherein the stopper-like insert fixes itself due to the resilience and the embodiment of the insert itself into the flange hole. In the case of the clamping process practically no forces result which cause the disc to twist. The result is a reliable and secure seating of the sealing surface by means of the disc encircling the insert. This in turn guarantees by means of its geometry and its additional inclusions in the form of beads or indentors on the side facing the flange a permanent seating which is highly resistant to stresses. Thereby penetration e.g. by blasting medium in the case of glass, sand or shot-blasting is practically prevented. The blasting stopper can be removed at as late a time as possible even long after the mechanical processing by means of a pulling arrangement on the disc whereby the optimum fit and grip between the stopper and the welding flange neck is released.

Additional details and benefits of the invention ensue from the following specification of the relevant drawings wherein a preferred exemplified embodiment is illustrated with the necessary details and individual parts for this purpose: In the drawings below

FIG. 1 shows a protective device with welding flange neck in section,

FIG. 2 shows a protective device in section,

FIG. 3 shows an opening in an insert in the form of a slit,

FIG. 4 shows an opening in an insert in the form of a notch,

FIG. 5 shows a variant to FIG. 3,

FIG. 6 shows a protective device with edge clips having curvatures and

FIG. 7 shows a clamping arrangement with edge clips having webs.

FIG. 1 shows a welding flange neck 2 which exhibits an internal hole 6. A partial surface 5 on the side 22 of the welding flange neck 2 in the form of the so-called seating surface 7 effectively protects against impurities. It is understood by this amongst other things that a penetration of blasting medium during the blasting and/or painting must be avoided. Corresponding to this welding flange neck 2 the protective device 1 is embodied in the form of the blasting stopper. The insert 3 corresponds with the flange hole 6 (internal diameter) such that the insert 3 and thereby the blasting stopper 1 when inserted is automatically secured due to its yielding capability. Openings 9 in this exemplified embodiment implement the resilience 8 by which this yielding capability of the insert 3 is produced. This concerns a slit 13 with rounding-off 14 which rounding-off 14 extends up to the end 10 of the insert 3 facing the disc 4 and parallel with respect to the longitudinal axis 11 of the insert 3. A further substantial and common component of the one-piece blasting stopper 1 is the disc 4, which in turn corresponds in its dimensions and embodiment with the flange-side seal 7. The disc 4 exhibits on its side 15 facing the flange 2 bead 17 which bead 17 extends concentrically through the entire 360° on its outer edge 19. An additional bead 18 is positioned further inside. On the side 16 facing the flange 2 of the disc 4 said disc 4 exhibits pulling arrangements 20, 20' in the form of lugs 21, 21'.
The function of the protective device 1 embodied as a blasting stopper is clearly shown again in FIG. 2 which shows an exemplified embodiment with different dimensions and a substantially larger dimensioned disc 4 in relation to the insert 3 transversely disposed thereto. The disc 4 exhibits on its side 15 facing the flange in the region of its outer edge 19 an outer bead 17 and further inside a bead 18. Between the beads 17, 18 and between the inner bead 18 and the insert 3 is respectively formed a space 23, 24, which if necessary shall be filled with a medium like grease such that no colour pigments could deposit on the sealing surface during painting. On the other side 16 facing away from the flange the pulling arrangements 20, 20' in form of the lugs 21, 21' can be clearly seen. In this case a tool, e.g. pliers, can be used to achieve a residue-free removal of the blasting stopper 1 after conclusion of the work. Preferred diameters of the disc 4 are at least 20 mm and of the insert 3 at least 10 mm.

Moreover the FIGS. 3, 4 and 5 show three different variants of an opening 9 in the insert 3. FIG. 3 shows an opening 9 in the form of a plain slit 13, FIG. 4 a notch 12 whose tip points in the direction of the disc and FIG. 5 an opening with a rounding-off 14 to avoid breaking or tearing of the plastic.

FIG. 6 shows a smaller protective device 1 in terms of dimensions with the insert 3. It is formed by a total of six edge clips of which three can be seen here and which are identified with reference numbers 30, 31, 32. Between the exposed edge clips the slits 45, 46 can be seen. For the improved fixation of said edge clips 30, 31, 32 they are of uneven thickness and exhibit at around the centre of their outer faces 34, 35, 36 outwardly inclined curvatures 38, 39, 40, 17 designates the external and 18 the internal bead. Both progress concentrically such that they enclose the interspace 23. On the other side of the disc 4 facing away from the insert 3 can be found two pulling arrangements 20, 20' embodied as lugs 21, 21'.

FIG. 7 shows a somewhat larger protective device 1 in the form of a blasting stopper having a total of eight edge clips of which four can be seen here and which are identified with the reference numbers 30, 31, 32, 33. These are disposed radiating away from the slits 45, 46, 47 and are embodied as particularly suitable clamping means. To this end the edge clips 30, 31, 32, 33 exhibit on their outer faces 34, 35, 36, 37 webs 41, 42, 43, 44. Said webs are disposed parallel with respect to the disc 4 in the end of the edge clips 30, 31, 32, 33 facing away in the direction of the disc 4. They stabilise the insert 3 and improve the clamping effect during the inserting into the welding flange necks.

1. Protective device (1) for welding flange necks (2) for pipe construction having a disc (4) for the covering of a partial surface (5) of the welding flange neck and having transversely disposed to said disc (4) an insert (3) via which insert (3) the protective device (1) is releasably connected to the welding flange neck (2) wherein the insert (3) is provided with a resilience (8) and is connectable to the welding flange neck (2) by means of a clamping connector, wherein the disc (4) on its side (15) facing the flange (2) exhibits an concentrically-extending bead (17) or indented.

2. Protective device according to claim 1 wherein the disc (4) is embodied corresponding to a sealing surface (7) provided on the welding flange neck (2).

3. Protective device according to claim 1 wherein the insert (3) exhibits at least substantially a cylindrical basic form.

4. Protective device according to claim 1 wherein the protective device (1) is manufactured from a plastic with a density of \( \geq 1 \text{ kg/m}^3 \).

5. Protective device according to claim 1 wherein the insert (3) exhibits openings (9) serving as a resilience (8).

6. Protective device according to claim 5 wherein the resilience (8) is formed by openings (9) extending parallel with respect to the longitudinal axis (11) of the insert (3).

7. Protective device according to claim 6, wherein the openings (9) are embodied as notches (12).

8. Protective device according to claim 6, wherein the openings (9) are embodied as slits (13).

9. Protective device according to claim 6, wherein the openings (9) are embodied as slits (13) with rounding-offs (14).

10. Protective device according to claim 1 wherein the insert (3) is formed by means of a plurality of separately disposed edge clips (30-33).

11. Protective device according to claim 10 wherein the edge clips (30-33) exhibit curvatures (38-40) on their outer faces (34-36).

12. Protective device according to claim 10 wherein the edge clips (30-33) exhibit webs (41-44) on their outer faces (34-37) which improve the clamping effect.

13. Protective device according to claim 1 wherein the bead extends (17) to the outer edge (19) of the disc (4).

14. Protective device according to claim 1 wherein the disc (4) is provided with a plurality of concentrically-progressing and preferably with two beads (17, 18).

15. Protective device according to claim 1 wherein the disc (4) on its side (16) facing away from the flange (2) exhibits at least one pulling arrangement (20).

16. Protective device according to claim 15 wherein the pulling arrangement (20) comprises at least one and preferably two oppositely disposed lugs (21).