

# Mini pre-packed monitoring wells

## Introduction

Mini pre-packed monitoring wells were developed for use in casings with a minimal diameter (from 36 to around 45 mm internal). See drawings Fig. 1 to 4. In a casing with a larger diameter (e.g. 77 mm internal) a single pre-packed mini filter can be combined with a Quality monitoring well below / next to it. The thicker components of the Quality monitoring well ensure a good bentonite seal in the borehole left behind by a 100 mm external casing. Where the two blind tubes run parallel to one another a seal can be fitted with bentonite bars (see Fig. 5 Filter duo assembly).

## How to use

- All mini perforated pipes pre-packed with sand and blind tubes with bentonite collars have an external screw thread on both ends. The same applies for the blind tubes and (bare) perforated pipes with an internal diameter of 15 or 18.2 mm. These can only be extended using rather expensive and thick connectors with internal screw threads. The connectors for the 15x20 mm tube are 27 mm external. The connectors for the 20x26.6 tube are 34 mm.
- Extension can be performed a good bit cheaper using a thicker HDPE blind tube of 25x32 mm because this does not need any additional connectors. The 25x32 mm tube has an external screw thread on one side and an internal one on the other so that they can be screwed directly to one another. They are then smooth inside and out. A connector is however needed to make the transition from the thin tube to the thicker 25x32mm tube.
- Fitting one or more bentonite collars or mini filters, higher up in the borehole calls for connectors not only from thin to thick tube, but also from thick to thin.
- Sand catchers are needed to prevent the fluid sand, loose filter sand, bentonite grains or grout from sinking down. The sand catcher is affixed to the tube with a tie wrap. There are three sizes of sand catcher; one for each size tube.
- In no design is it possible to allow a pump or measurement system > 13 mm (such as the Diver) to descend right down into the filter (except in the lower of the two duo filters see Fig. 5). For sampling and Diver measurements this is no problem, as they can also be positioned somewhat higher in the blind and larger section of the well. Providing of course that the equipment remains under water. For the passive sampling system Sorbisense GWSflex (item. no. 12.71.01) it is essential that it is suspended in the filter. So choose our Quality filter. That has an internal diameter of 25 mm over the full length. The Quality filter should be used in casings (or boreholes) with internal diameters from 66 mm.
- In the duo installation a larger pre-packed filter and bentonite collar are used; namely those from the Quality monitoring well. The bentonite collar that goes with this is available in two diameters. One for use with 66 mm casings and one for use in 77 mm internal casings. These guarantee sufficient swelling for the borehole diameters.
- Higher up in the duo installation, where the riser pipes run close to one another, a bentonite seal consisting of loose bentonite bars is used. The riser pipes are then surrounded by the recesses in the bentonite bars. Two bentonite bars are necessary per half metre. They are made to fit a 77 mm internal casing (see also Fig. 5). The seals have a swelling capacity for casings with an external diameter of 107 mm.
- Do not overestimate the swelling capacity of the thinner mini pre-packed collars (Fig. 1 to 4). Do not use the product in casings with too large an external diameter (stay within 70 mm). It takes several days for a collar to swell in a clay layer. During these days, sand catchers are used to provide a temporary seal.
- Just like grains or grout, collars do not swell in pure hydrocarbon product. In water with a very high conductivity (e.g. > 25 mS/cm) the swelling capacity and in particular the cohesion of the bentonite is reduced.



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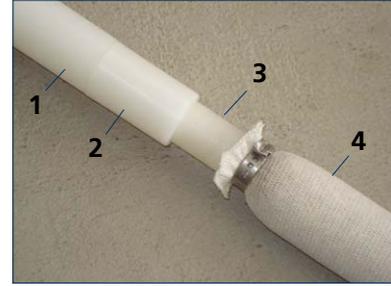




Three types of SmartWell filters side-by-side: Mini pre-packed; DirectWell and Quality filter



Mini pre-packed monitoring well with filter sand pre-packed in tight-fitting filter gauze (right) with riser pipe 18.2x26.6 mm with coupler and top cap



1. Riser pipe 18.2x26.6mm  
2. Coupler from tube 15x20 mm to riser pipe 18.2x26.6 mm  
3. End of filter tube  
4. Filter sand pre-packed with gauze

## Overview of items

### Tube material

Item ID	Short description
10.05.01.20	35 mm pre-packed filter, tube dimensions 20 x 15 mm, L=1m ( 5 x) *
10.04.01.20	35 mm blind tube with bentonite collar 20 x 15 mm, L=1 m ( 5 x)*
10.01.85.01	26.6 mm HDPE external screw thread both sides blind 2 metres (35 x)*
10.01.85.01.02	26.6 HDPE ext. screw thread both sides filter 1 metre (35 x)*
10.01.22.02	32 mm HDPE ext./int. screw thread 2 m (35 x)
10.05.01.32	60 mm pre-packed filter, tube dimensions 32x25 mm L=1m ( 5 x) **
10.04.03.32	60 mm blind tube with bentonite collar 32x25 mm L=1 m ( 5 x)**
10.04.01.32	70 mm blind tube with bentonite collar 32x25 mm L=1 m ( 5 x)**

### Connectors

10.05.01.20.01	Connector 20 to 20 for extending filters ext. 27 mm ( 20 x)
10.05.01.20.02	Connector 20 to 26.6 ( 20 x)
10.05.01.20.03	Connector 20 to 32 for extending filters ( 20 x)
10.05.01.20.05	Connector 32 to 20 for return to bentonite or perforated pipe (20 x)
10.01.85.02	Connector 26.6 to 32 (20 x)
10.05.01.20.04	Connector 26.6 to 20.0 (20 x)
10.01.85.04	Connector 26.6 to 26.6 ext. 34 mm ( 20 x)

### Miscellaneous

10.01.85.03	Top cap (collar with screw cap yellow) 26.6 mm ( 20 x)
10.01.25	Top cap HDPE for tube 32mm ext. (10 x)
10.01.26	Bottom cap of pre-packed filter of Quality monitoring well 25x32 mm (10 x)**
10.01.85.05	Bottom cap of monitoring well 26.6mm (20 x)
10.01.15	Bottom cap of monitoring well 20 mm (10 x)
10.01.99.63	Sand catchers 26.6 mm ( 50 x)
10.01.99.62	Sand catchers 20 mm ( 50 x)
10.04.99.64	Sand catcher 32 mm (50 x)
10.91.01	Bentonite bars borehole 77 mm with duo tube 32 mm 60 x =15 m

\* = only extendible using connectors

\*\* = only for lowest monitoring well in duo construction (Fig. 5)

## Overview drawings

### Figure 1 shows:

- Monitoring well internal 15 mm (with pre-packed filter and bentonite section) going into 18.2 mm internal riser pipe. Can be used in casings with internal diameter from 36 mm. Expected swelling capacity 70 mm.  
Application: more expensive alternative for set-up as in Figure 2 or 3.

### Figure 2 shows:

- Monitoring well internal 15 mm (with filter and bentonite section) going into 25 mm internal riser pipe. Can be used in casings with internal diameter from 36 mm. Expected swelling capacity 70 mm.  
Application: for use with Diver or bladder pump from 22 mm.

### Figure 3 shows:

- Monitoring well internal 15 mm (with filter and bentonite section) with blind sections 18.2 mm internal diameter. Can be used in casings with internal diameter from 36 mm. Expected swelling capacity 70 mm.  
Application: Soil profile with several clay layers to be sealed.

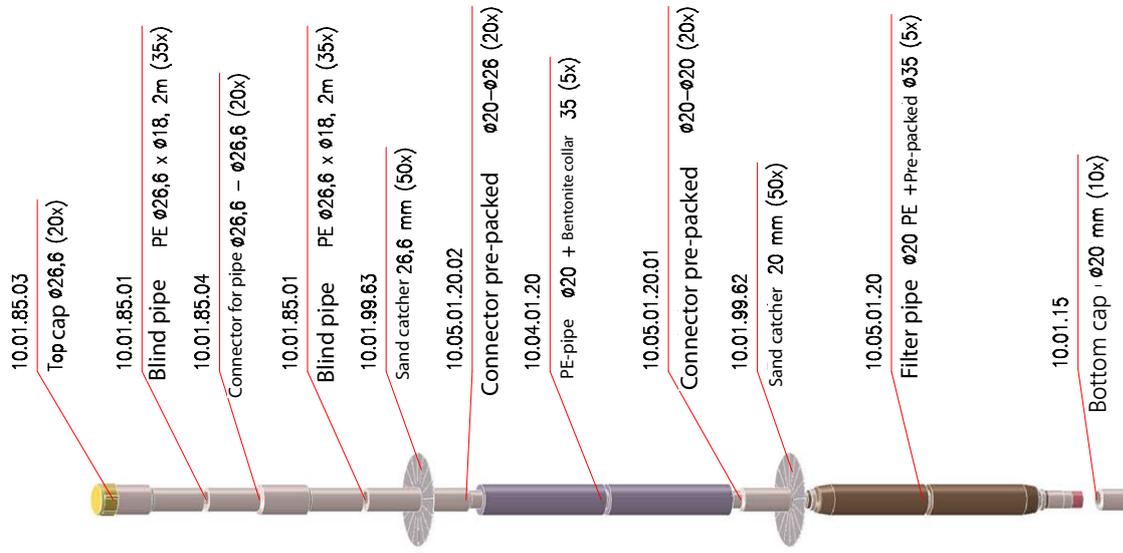
### Figure 4 shows:

- Monitoring well internal 15 mm (with filter and bentonite section) with blind spacers 25 mm internal diameter. Can be used in casings with internal diameter from 36 mm. Expected swelling capacity 70 mm.  
Application: Soil profile with several clay layers to be sealed. Cheaper method of extension than with blind tubes and couplers as in Fig. 1 or 3.

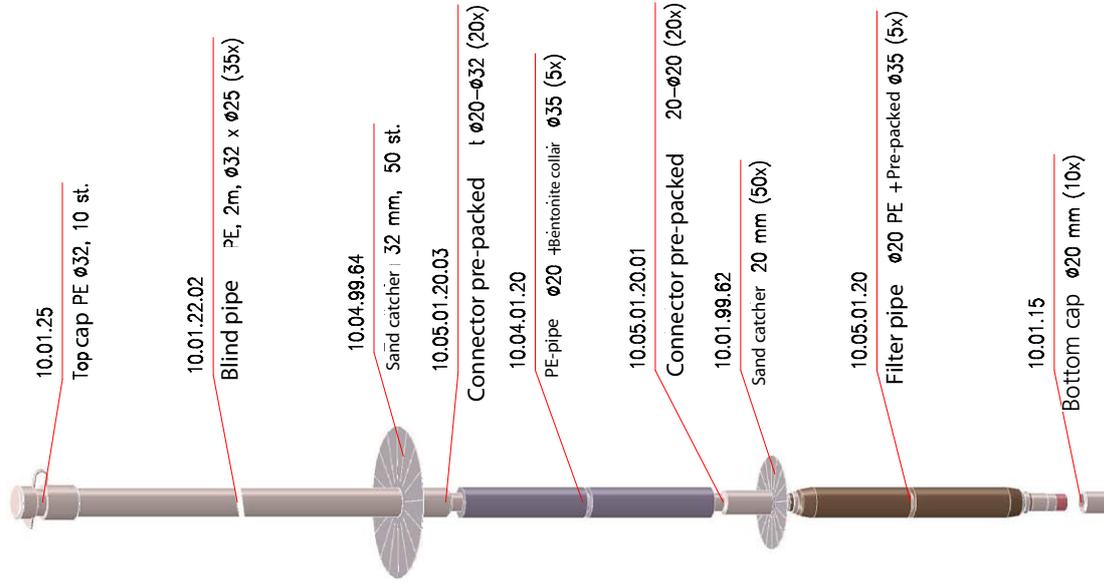
### Figure 5 shows:

- Lower monitoring well internal 25 mm (with filter and bentonite section) with blind extension tubes 25 mm internal diameter. Bentonite section available for 65 or 75 mm internal tube. Above / next to this pre-packed mini-filter internal 15 mm with transition to riser pipe 25x32 mm. Parallel riser pipes to be sealed with bentonite bars (affix or over full height). To be combined with sand catchers for 32 mm tube. Duo system can be used in casings with internal diameter from around 75 mm. Sealing assured for borehole up to 100 mm.

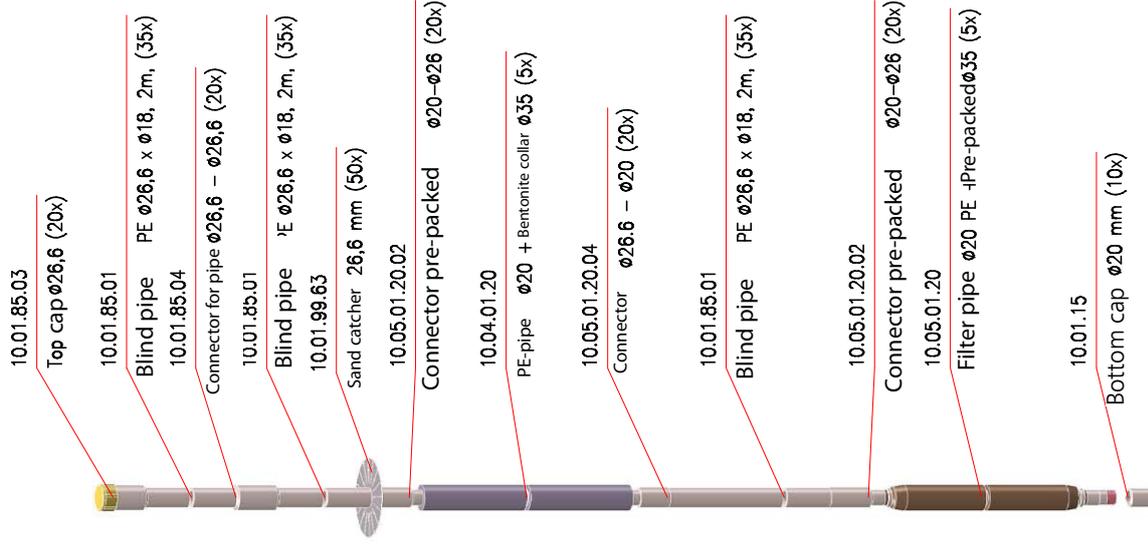
**Figure 1**  
Filter + collar 20 mm; blind pipe 26.6 mm



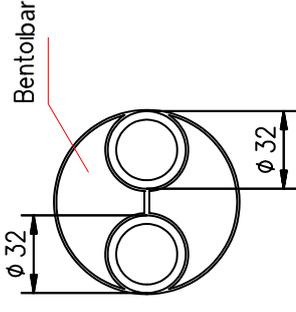
**Figure 2**  
Filter + collar 20 mm; blind pipe 32 mm



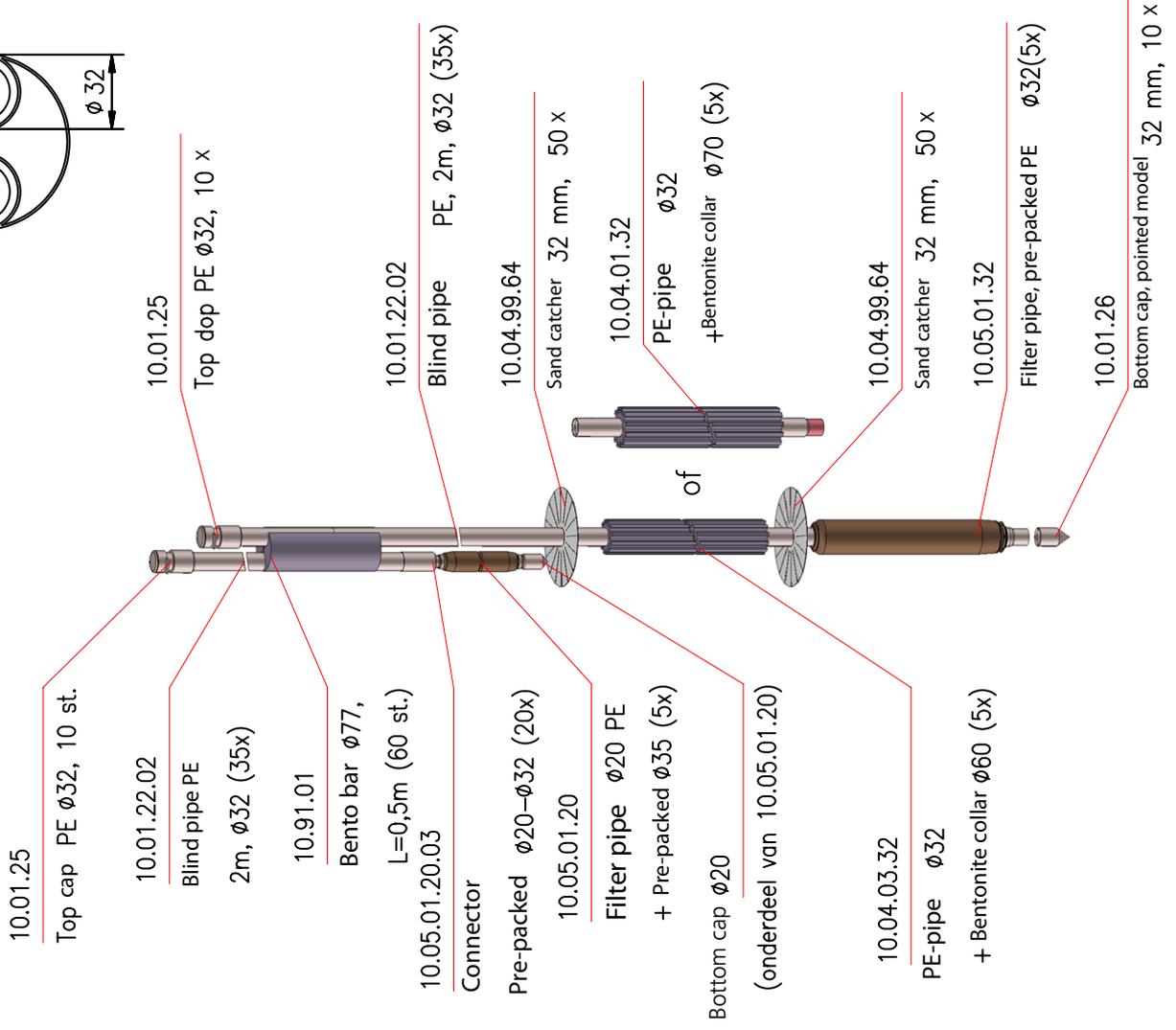
**Figure 3**  
Filter + collar 20 mm; coupling pieces 26.6 mm



GP100 ID=77mm



**Figure 5**  
Filter duo - assembly



**Figure 4**  
Assembly 20 - 32 - 20 mm

