

## Neo Joint,

Fitting to use for the connection of the flexible pipe which has strong seal performance.

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### 1. Introduction

Stainless flexible pipes were first used in place of traditional steel pipes around 1982 for city gas and LP gas piping. Since then, these flexible pipes have become established as standard house piping materials because they help shorten the house construction periods, require small piping space, and have excellent high earthquake resistance. Osaka Gas Co. has exerted unrelenting efforts to extend the application range of flexible pipe-laying work and improve or develop related piping technologies.

This paper describes a new type of flexible pipe joint named "Neo Joint." Osaka Gas Co. developed this joint together with JFE Pipe Fitting Mfg. Co. and has put it into practical use since July 2009.

### 2. Product Concept

Since a large number of flexible pipe joints are used in gas piping work to connect flexible pipes, unrelenting effort is required to ensure more stable pipe connection work quality. With flexible pipe joints other than the Neo Joint, pipe fitters in charge often overlook even when pipes are not inserted sufficiently into corresponding pipe joints. For a flexible pipe that requires seal packing to be laid over the bellows (bulges), the pipe fitter must visually inspect the pipe surface carefully for defective conditions (depressions or scratching) before inserting the pipe into the joint. As described above, conventional pipe joints rely largely on the technique and discretion of pipe fitters.

The Neo Joint has been developed under the following product concepts:

- To realize a pipe joint that simplifies piping work and thereby enables pipe fitters to detect piping error by themselves.

- To realize a pipe joint that minimizes the effects of pipe surface conditions on pipe sealing performance.



Fig. 1. External appearance of Neo Joint

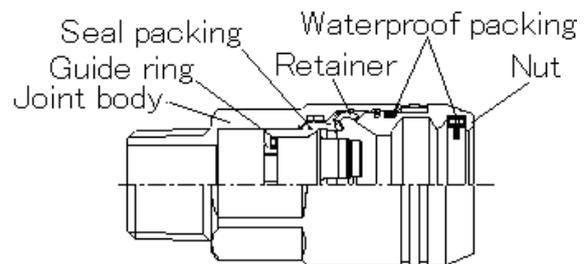
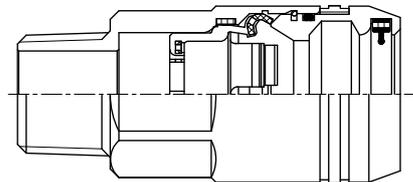


Fig. 2. Construction of Neo Joint

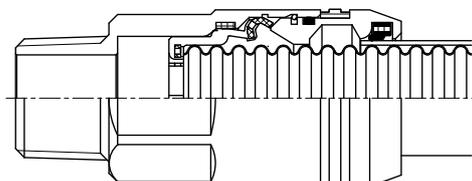
### 3. Pipe Fitting Method

Fitting a flexible pipe to a Neo Joint is completed when the pipe fitter cuts the pipe to a predetermined length, inserts one end of the pipe into the joint, and pushes the nut into the joint. The procedure for fitting a flexible pipe to a pipe joint is shown schematically below.

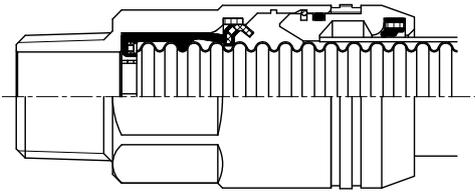
- ① Before insertion of flexible pipe.



- ② Insert the flexible pipe into the joint until the pipe end hits the guide ring. (Peel off the flexible pipe covering for a length of eight bulges.)



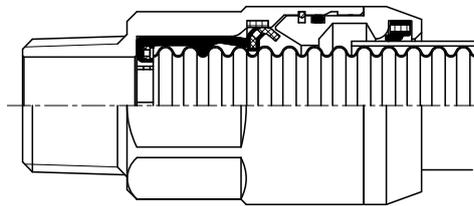
- ③ The guide ring, seal packing and retainer will move along with the flexible pipe.



(The seal packing and retainer will be guided by the tapered inside face the joint body until they are finally caught into the bellows root.)



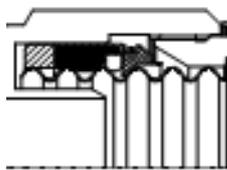
- ④ Push the nut into the joint.



#### 4. Advantages of Neo Joint

- (1) Provides more stable sealing performance

A newly developed bellows bottom-sealing mechanism presses the sealing end of the packing against the bottom of the pipe bellows, thus minimizing the effects of any surface defects of the flexible pipe (such as depressions or scratching) on pipe sealing performance.



Non-Neo Joint flexible pipe joint  
Flexible pipe sealed at top of bellows



Neo Joint  
Flexible pipe sealed at bottom of bellows

- (2) Stabilizes pipe fitting work quality – eliminates human error

The Neo Joint incorporates a mechanism that does not allow the push nut to be put in place if the flexible pipe is insufficiently inserted into the joint or the pipe covering remains unpeeled for the specified length. Therefore, the pipe fitter is able to notice by oneself any error in the flexible pipe fitting work (pipe joint design that completes pipe fitting work only when a predetermined length of pipe is inserted into the joint). Moreover, the push nut portion is colored to remind the pipe fitter to push in the nut (eliminating human error).

- (3) Improved joint quality

- ① Reduced flexible pipe insertion force

The newly developed mechanism, which presses the sealing end of the packing against the bottom of the pipe bellows, reduces the flexible pipe insertion force even in a low-temperature environment.

- ② Sensory confirmation of flexible pipe insertion

Insertion of a flexible pipe into its corresponding joint can be confirmed via the sense when the packing is caught in the bottom of the bellows.

- ③ Does not require nut-tightening tool

A flexible pipe can be fitted manually to a pipe joint without using any tool, simplifying flexible pipe fitting in high or restrictive locations.

- ④ Allows flexible pipe to rotate freely after fitting

Since a flexible pipe can be rotated freely after it is fitted to a pipe joint, twisting of pipe can be easily corrected. Moreover, gas valves and other devices can be connected after completion of pipe connection to the joint, thereby simplifying piping procedures.