

## Fire-Protection Kits “PUCHIROKU” Series for the Transfer Section of Partition

### 1. INTRODUCTION

The Building Standard Law requires buildings to be compartmented by fire-protection walls or floors per certain area for the purpose of restraining the spread of fire to a limited extent. It is called a fireproof compartment. Also, the Law requires the transfer sections in the compartments where cables or plastic pipe penetrate to be fire-protected to prevent the spread of fire along them. The installation methods must obtain certifications by the Minister of Land, Infrastructure and Transportation (hereinafter called a certification).

Furukawa Techno Material has developed the installation methods which meet the various needs for fire protection in the transfer sections. We have obtained certifications for them and then commercialized them. “PUCHIROKU” series are kit products which have been developed and commercialized for the transfer sections of small circular apertures from  $\phi 20$  mm to  $\phi 150$  mm of aperture diameter. The casing structure using a resin sleeve with a fire protection material inside provides benefits of not only “easy installation” and “capability of reinstallation”, but also “capability of dressing”, which are

necessary for small circular apertures.

### 2. LINEUP

“PUCHIROKU” series has two kinds of products (Table 1): “PUCHIROKU (part number NPR-20 - 50)” for micro aperture diameter in the wall from  $\phi 20$  mm to  $\phi 50$  mm, and “PUCHIROKUWIDE (part number PW-75 - 150)” for aperture diameter in the wall and the floor from  $\phi 75$  mm to  $\phi 150$  mm.

As shown in Figure 1, both products are the kit products which have all the necessary member of framework needed for a fire-protected aperture. If the installation site and the aperture radius are decided, the product and the part number can be easily selected.

### 3. CONSTRUCTION

Figure 2 shows the construction of “PUCHIROKU”. First, engage the half-cut resin sleeves with the intumescent material inside and insert it into the aperture area. Then, fill up 5 mm of the heat-resistance seal material between

Table 1 PUCHIROKU series lineup.

		Aperture radius (mm)						
		$\phi 20$	$\phi 40$	$\phi 50$	$\phi 75$	$\phi 100$	$\phi 125$	$\phi 150$
Application site		PUCHIROKU (Certified by the Minister of Land, Infrastructure and Transportation) Wall: PS060WL-0435, 0436			PUCHIROKUWIDE (Certified by the Minister of Land, Infrastructure and Transportation) Wall: PS060WL-0367, 0368 Floor: PS060FL-0510			
Wall	Normal aperture	NPR-20	NPR-40	NPR-50	PW-75	PW-100	No certification	
	Metallic conduit pipe	No certification						
	Floor	No certification			PW-125	PW-150		



Figure 1 Parts of the kit (PUCHIROKUWIDE).

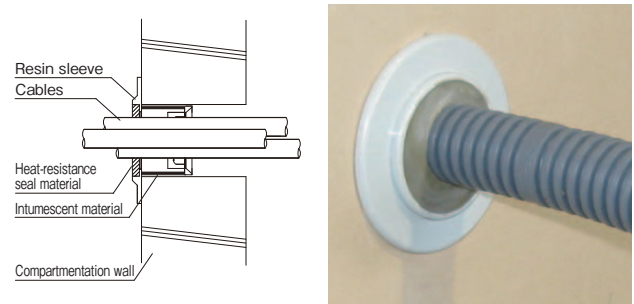


Figure 2 Construction of PUCHIROKU.

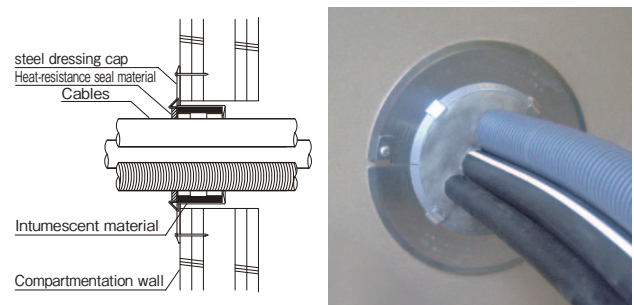


Figure 3 Construction of PUCHIROKUWIDE (for wall).

the cables and the aperture.

“PUCHIROKUWIDE” is a large version of PUCHIROKU. As shown in the Figure 3, a steel dressing cap is used to fix with the screw.

#### 4 INSTALLATION CONDITION

Table 2 shows the installation conditions of “PUCHIROKU series”.

They are applicable to the transfer sections of the compartments in condominium buildings and in office buildings, the parting walls in apartment buildings, and the partition walls in schools, hospitals and child welfare buildings (compartments ruled in the Building Standard Law Enforcement Order article 114). All of the above are the main examples of the application.

Also, except for some cases, installation is possible from one side of the wall and from above the floor.

**Table 2 Installation condition.**

Construction of wall or floor certified by the Minister of Land, Infrastructure and Transportation			PUCHIROKU		PUCHIROKUWIDE	
			Thickness (mm)	Installation condition	Thickness (mm)	Installation condition
Wall	Normal aperture	Reinforced or Autoclaved lightweight aerated concrete	Greater or equal to 70	One side	Greater or equal to 80	One side
		Middle-space partition wall	Greater or equal to 80	Both sides		
		Thin wall	Greater or equal to 42	One side	Out of certification	
Metallic conduit pipe	Reinforced or autoclaved lightweight aerated concrete	Out of certification		Greater or equal to 80	Both sides	
	Middle-space partition wall	Out of certification		Greater or equal to 100	Above floor	
Floor	Reinforced or autoclaved lightweight aerated concrete	Out of certification		Greater or equal to 100	Above floor	

#### 5. PROPERTIES

##### 5.1 Easy Installation

The installation is finished only by inserting the resin sleeve and then filling up the heat-resistance seal (in the case of WIDE, fixing with a screw is needed afterward). Because no special tools and skilled techniques are needed, anyone can easily install them.

##### 5.2 Stable Installation Quality

Because the installation is a quantitative installation using the resin sleeve with an intumescent material inside, anyone can install them with a consistent quality.

##### 5.3 Capability of Reinstallation

Because the once-installed resin sleeve and heat-resistance seal can be uninstalled easily and used again, they can be easily applied to rewiring work.

##### 5.4 Applicable to Pliable Plastics Conduit pipe

As shown in Table 3, they can be installed in the aperture area wired with cables and also with a pliable plastics

conduit pipe (PF/ CD pipe).

#### 5.5 Good Installation Finish

Because there is almost no protuberance from the wall or the floor, the finish is good.

**Table 3 Applicable cable and pipe.**

Applicable cable and pipe	PUCHIROKU	PUCHIROKUWIDE		
	Wall	Wall		Floor
		Normal aperture	Metallic conduit pipe	
Cable (Conductor cross section: mm <sup>2</sup> )	Less or equal to 38	Less or equal to 150	Less or equal to 325	Less or equal to 250
Pliable plastics conduit pipe (nominal diameter)	PF/CD pipe less or equal to 28	PF pipe: less or equal to 28		PF/CD pipe less or equal to 36
Application to cable and conduit	Impossible	Possible		

#### 6. PURPOSE

##### 6.1 PUCHIROKU

With the spread of demand for cable and optical televisions including the Internet and the video delivery, their adoption rates are high especially in the existing buildings such as elder care facilities, school-related facilities, medical-related facilities and accommodation facilities. Those buildings have the transfer sections of small aperture to install several related cables. PUCHIROKU is used in such areas (Figure 4).

Other than that, PUCHIROKU is used in various transfer sections of small aperture such as for the power cable transfer sections of small aperture in apartment buildings and interphone power cable transfer sections in condominium buildings.



**Figure 4 Example of PUCHIROKU installation (in welfare facility).**

##### 6.2 PUCHIROKUWIDE

It is used in the following places: the floor transfer sections of the line cables (600 V CVT100 - 250 mm<sup>2</sup>, etc.) constructed in the meter box of condominium buildings and in the pipe shafts of office buildings, the floor and the wall transfer sections of mixed cables (cables and pliable plastics conduit pipe (PF pipe, etc.)) in stores, hospitals and school-related facilities.

## **7. PATENT, TRADEMARK**

“PUCHIROKU” has been patented and “PUCHIROKUWIDE” is patent pending. Both are pending for trademark registration.

## **8. CONCLUSION**

We have developed and commercialized “PUCHIROKU series”. Its casing structure has achieved easy-construction and capability of reconstruction required for the transfer sections of small circular aperture.

In the future, we will obtain an evaluation of the Fire Equipment and Safety Center of Japan Foundation based on the certifications of the Minister of Land, Infrastructure and Transportation. After obtaining the evaluation, we will progress on the commercialization with an expanded range of application which can be applied to the transfer sections in apartment buildings ruled by the Fire Defense Law.

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