

# EJECTOR SLEEVE AND CENTER PIN COMBINATION

## Ejector Sleeve and Center Pin Combination Example

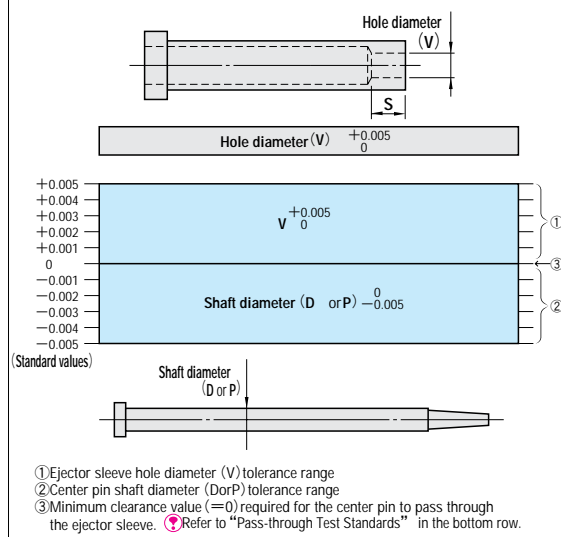
		Center Pin Shaft Diameter (DorP) Tolerance	
		0 -0.005	-0.01 -0.02
Ejector sleeve hole diameter (V) tolerance	+0.005 0	<b>Suitable</b> Because the clearance between the ejector sleeve and center pin is kept to 0.01 mm and below, this is used in cases where the plastic is conducive to the development of burrs, and for precision molds.	<b>Suitable</b> Because the clearance between the ejector sleeve and the center pin is large, this is used in applications where smooth sliding is required. (※The hole diameter of the ejector sleeve can also be made 0.01 mm larger.)
	+0.01 0 and H7	<b>Unsuitable</b> Combination of the ejector sleeve and the center pins $\begin{smallmatrix} 0 \\ -0.005 \end{smallmatrix}$ shaft diameter tolerance is unsuitable, due to the large contact surface with the center pin. If the same dimensions are designated for hole diameter and shaft diameter. The problems with the pins not fitting the holes or stopping partially into the holes, or unsmooth sliding movement may occur.	<b>Suitable</b> The minimum clearance required for fit between the ejector sleeve and center pin (0.01 mm) can be achieved. This is widely used in general applications, where the plastic is not conducive to the development of burrs.

## Ejector sleeve and center pin fit clearance

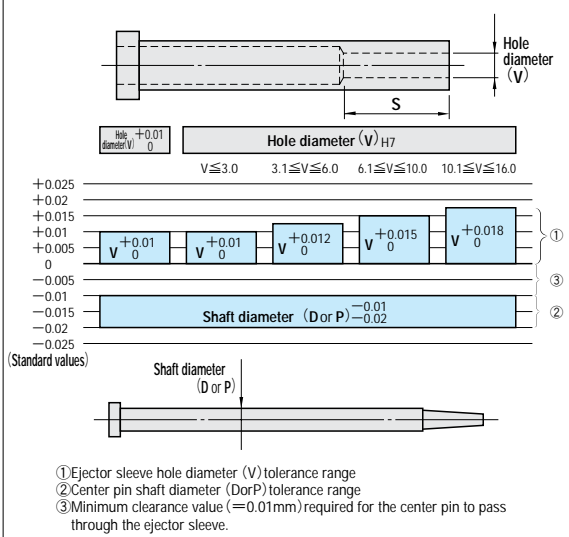
①...Ejector sleeve hole diameter (V)  
②...Center pin shaft diameter (DorP)  
③...Ejector sleeve and center pin fit clearance

- The figure on the left shows sleeve fit, when the same dimensions have been specified for ejector sleeve hole diameter (V) and center pin shaft diameter (DorP).
- MISUMI ejector sleeves and center pins are produced separately, with tolerance control exercised on each (with the exception of set products). For this reason, the minimum clearances indicated below are necessary.

### Hole Diameter (V) $\begin{smallmatrix} +0.005 \\ 0 \end{smallmatrix}$ and Shaft Diameter (DorP) $\begin{smallmatrix} 0 \\ -0.005 \end{smallmatrix}$ Combination



### Hole Diameter (V) $\begin{smallmatrix} +0.01 \\ 0 \end{smallmatrix}$ H7 and Shaft Diameter (DorP) $\begin{smallmatrix} 0 \\ -0.02 \end{smallmatrix}$ Combination



## Pass-Through Test Standards for the Ejector Sleeve

### Hole Diameter (V) $\begin{smallmatrix} +0.005 \\ 0 \end{smallmatrix}$

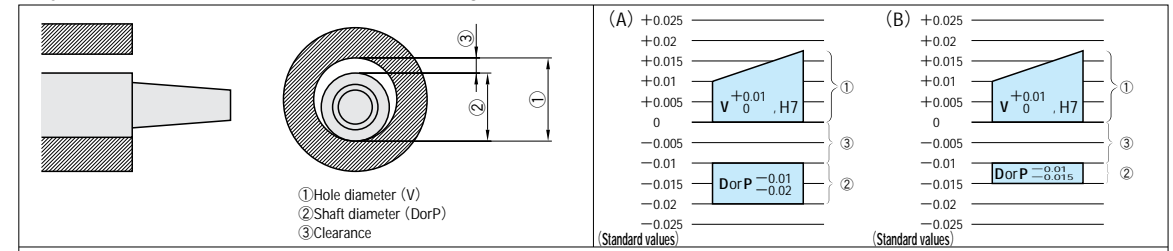
① Test using a pass-through test pin  
② Test using a pin gauge

- The  $\begin{smallmatrix} +0.005 \\ 0 \end{smallmatrix}$  hole diameter (V) ejector sleeve is used in combination with a  $\begin{smallmatrix} 0 \\ -0.005 \end{smallmatrix}$  shaft diameter tolerance center pin. Because a  $\begin{smallmatrix} 0 \\ -0.005 \end{smallmatrix}$  shaft diameter tolerance center pin must pass through, the sleeve is subjected to a two-stage test, first inserting a  $\pm 0.001(V)$  pass-through test pin from the head side of the sleeve, and then inserting a  $\pm 0(V)$  carbide pin gauge from the tip side of the sleeve.

### Hole Diameter (V) $\begin{smallmatrix} +0.01 \\ 0 \end{smallmatrix}$ H7

- The  $\begin{smallmatrix} +0.01 \\ 0 \end{smallmatrix}$  H7 hole diameter (V) ejector sleeve, with its long sleeve section dimensions, is used in combination  $\begin{smallmatrix} 0 \\ -0.02 \end{smallmatrix}$  shaft diameter tolerance center pin. Because a  $\begin{smallmatrix} 0 \\ -0.02 \end{smallmatrix}$  shaft diameter tolerance center pin must pass through, the sleeve is tested by inserting a  $\begin{smallmatrix} 0 \\ -0.007 \end{smallmatrix}$  (V) pass-through test pin from the head side of the sleeve.
- Note that troubles may arise in which  $\begin{smallmatrix} 0 \\ -0.005 \end{smallmatrix}$  shaft-diameter tolerance center pins do not fit the holes, the pins stop partially into the holes and sliding is not smooth due to the length of the sleeves section (S) of the ejector sleeves.

## Ejector Sleeve (V $\begin{smallmatrix} +0.01 \\ 0 \end{smallmatrix}$ H7) Fit Clearance Range (maximum and minimum values)



Ejector sleeve	(A) Normal Combination	(B) Combination for Minimizing the Maximum Clearance Values
Hole diameter (V) $\begin{smallmatrix} +0.01 \\ 0 \end{smallmatrix}$ H7	Center pin shaft diameter (DorP) $\begin{smallmatrix} 0 \\ -0.01 \end{smallmatrix}$ (When shaft diameter tolerance is $\begin{smallmatrix} 0 \\ -0.01 \end{smallmatrix}$ ) Where shaft diameter (DorP) = V is specified	Center pin shaft diameter (DorP) $\begin{smallmatrix} 0 \\ -0.015 \end{smallmatrix}$ (When shaft diameter tolerance is $\begin{smallmatrix} 0 \\ -0.005 \end{smallmatrix}$ ) for center pins Where shaft diameter (DorP) = (V) - 0.01 is specified
① Hole Diameter Range	② Shaft Diameter Range	③ Clearance Range
$V \begin{smallmatrix} +0.01 \\ 0 \end{smallmatrix}$	$(DorP) \begin{smallmatrix} -0.01 \\ -0.02 \end{smallmatrix}$	0.01~0.03
$V \begin{smallmatrix} +0.012 \\ 0 \end{smallmatrix}$		0.01~0.032
$V \begin{smallmatrix} +0.015 \\ 0 \end{smallmatrix}$		0.01~0.035
$V \begin{smallmatrix} +0.018 \\ 0 \end{smallmatrix}$		0.01~0.038

- In order to hold the maximum fit clearance values below that of \* (A) Normal Combination, first select a shaft diameter designation (0.01 mm) type of SKH51  $\begin{smallmatrix} 0 \\ -0.005 \end{smallmatrix}$  tolerance straight center pin or stepped center pin, and designate a shaft diameter 0.01 mm smaller than the sleeve's hole diameter (V). This results in a \* (B) Combination for Minimizing the Maximum Clearance Values.\*
- The SKD61+Nitriding product group also includes an ejector sleeve and center pin set that holds clearance to under 0.03 mm.

## Ejector Sleeve Recessed Hole (C)

● The ejector sleeves have been designed to be used in combination with the center pins. Smooth sliding will not be possible if the fit section of the hole diameter (V) is too long for the center pin. This is why the length of the hole diameter (V) has been designed to be (S), while the remainder of the length (L-S) is recessed as the recessed hole (C).

● The recessed hole (C) is only applied with rough finishing. The precision standards regard a product acceptable if the corresponding straight center pin is able to pass through the sleeve.

### Precision Standards for the Ejector Sleeve Recessed Hole (C)

	V $\begin{smallmatrix} +0.005 \\ 0 \end{smallmatrix}$	V $\begin{smallmatrix} +0.01 \\ 0 \end{smallmatrix}$ and V H7
Recessed hole (C) precision standards and test methods		
Recess hole (C) size and precision (reference)	$C = V + (0.2 \sim 0.4)$ $C \pm 0.1$ Deflection of C: 0.1mm/100mm (reference value) Concentricity of C against V: 0.2mm (reference value)	$C = V + 0.5$ $C \pm 0.1$ Deflection of C: 0.1mm/100mm (reference value) Concentricity of C against V: 0.2mm (reference value)

### Precautions when Inserting a Stepped Center Pin's Shaft Diameter (D) into an Ejector Sleeve's Recessed Hole (C)

$C \geq D + 1.0$      $CW \geq D + 1.0$

- The precision standard of the recessed hole (C) is tested by inserting the appropriate standard pass-through test pin during pass-through and fit testing. The sole test standard here is whether the appropriate corresponding straight center pin passes through the sleeve hole diameter (V). For this reason,  $C \geq (D + 1.0)$  is necessary in order to be able to insert a stepped center pin's shaft diameter (D) into the recessed hole (C) without problem. Please take note of this.
- The 2-stage recessed hole (when using CW codes) is  $CW \geq (D + 1.0)$ .