

**SUNGMO**

# TUBE EXPANDERS



**SUNGMO IND**

# Standard type expanders

The following reference showing the application and the appropriate Sungmo Expander type is provided as a quick, easy guide. Sungmo Expanders are precision made, designed for toughness and durability, as well as to provide the ultimate of tube to tube sheet seal. The correct selection for application and correct use are essential to gain these advantages which Sungmo Expanders provide.

## AS-MB type expander



For Oil coolers, Air coolers, Preheaters, Radiators

Tube ID 5.4mm (7/32 in) to 10mm (3/8 in)  
Roller length of 25mm(1 in)  
accommodate the range of tube sheet thickness  
Adjustable ball bearing collar to set expansion length

## AS-CB type expander



For condensers, Heat exchangers, Superheaters

Tube ID 9mm(3/8in) to 92mm(3-1/8in)  
Standard Roller length of 38mm(1-1/2in), 57mm(2-1/4in)  
and 76mm (3in) accommodate the full range of tube sheet  
thickness  
Adjustable ball bearing collar to set expansion length

## AS-HB type expander



For condensers, Heat exchangers

Tube ID 9mm(3/8in) to 92mm (3-5/8in)  
Roller length of 38mm (1-1/2in), 57mm (2-1/4in) and  
76mm (3in)  
For tube sheets of more than 75mm (3 in) thickness and  
double tube sheets.  
Adjustable ball bearing collar to set expander reach

To accommodate applications outside of the average range of tube expanding work, Sungmo has developed these special type expanders.

## AS-BK type expander

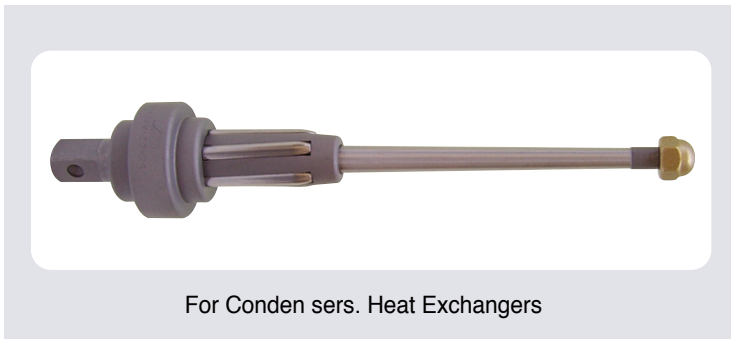


Tube ID 20mm(13/16in) to 106mm(4-3/16in)

Mandrels - drum, header, and short.

Parallel expanding rollers and flaring rollers.

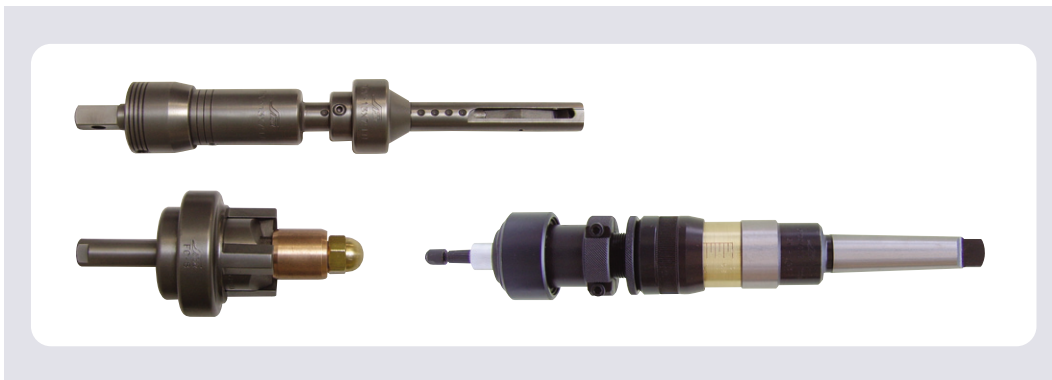
## Five - Roller expander



Designed for smooth and accurate expansion of

thin walled tubes, such as titanium tubes.

## Grooving Tool, ETC



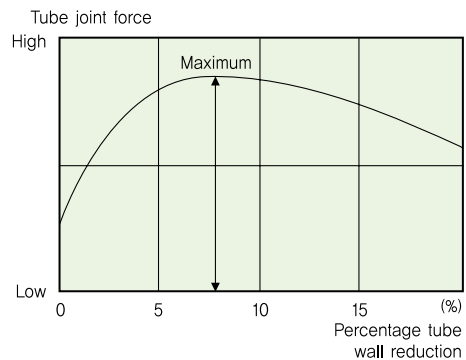
## Determining Proper Amount of Tube Expansion.

Percentage reduction of tube wall thickness is generally taken as the guide to the correct amount of expansion to obtain maximum seal between tube and tube sheet, but as the percentage tube wall reduction depends on the diameter of the tube sheet hole, tube O.D, tube wall thickness, and materials of the tube sheet and tube it is a variable factor.

In general terms the percentage tube wall reduction will be in the range of 5 to 10%.

The following table illustrates the varying percentage tube wall reduction according to different materials of the tube sheet and tube.

Tube sheet material	Tube material	Percentage tube wall reduction
steel	steel	7%
steel	copper	5%
copper	copper	10%



## Percentage Reduction of Tube wall Thickness.

$$Wt = \frac{(D - d_0) - (H - d_1)}{(D - d_0)} \times 100$$

$$d_1 = H - (D - d_0) \times (1 - Wt / 100)$$

Wt = percentage Reduction of Tube Wall Thickness(%)

H = Tube Sheet Hole Dia (m.m)

D = Tube O.D (m.m)

d<sub>0</sub> = Tube I.D (m.m)

d<sub>1</sub> = Tube I.D After Expanding (m.m)

## Percentage Increased of Tube inside Diameter.

$$Wd = \frac{d_1 - (d_0 + C)}{(d_0 + C)} \times 100$$

$$d_1 = (d_0 + C) \times (1 + Wd / 100)$$

Wd = percentage Increased of Tube I.D (%)

d<sub>0</sub> = Tube I.D (m.m)

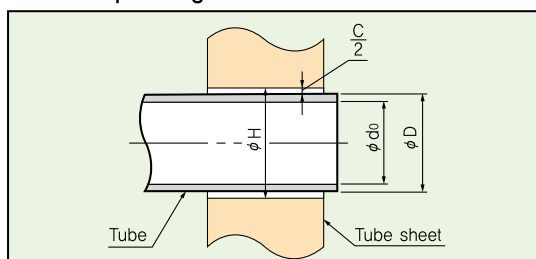
d<sub>1</sub> = Tube I.D After Expanding (m.m)

C = Clearance Between the Tube O.D and the Tube Sheet

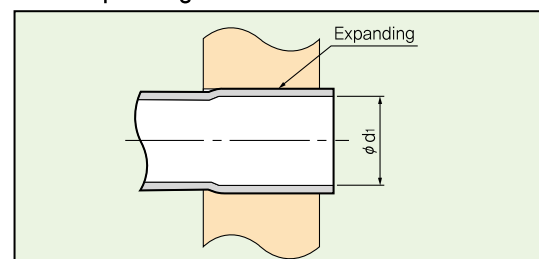
Hole Dia(m.m)

$$(C = H - D)$$

Before Expanding



After Expanding

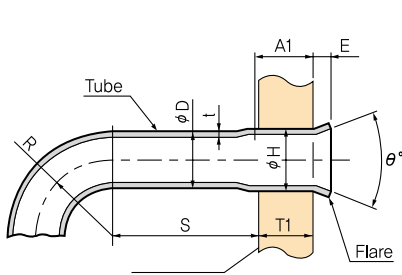
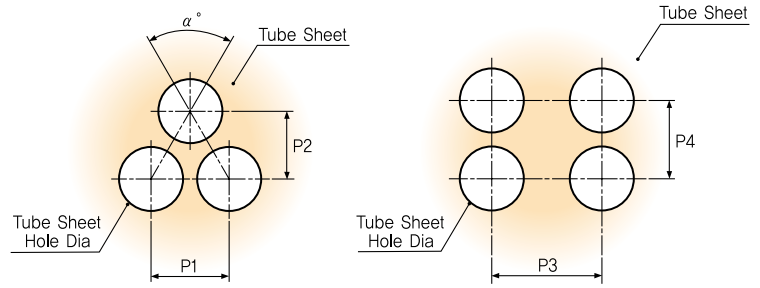




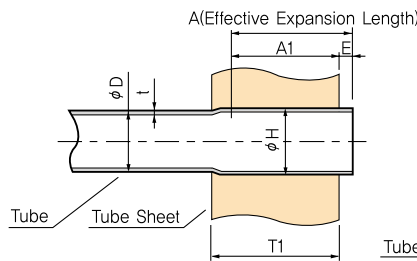
# Standard type expanders

## When ordering please supply the following information.

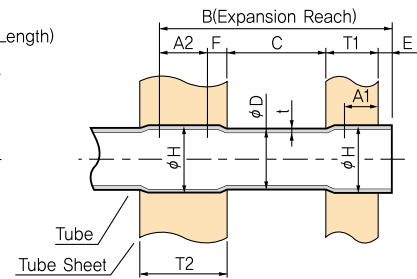
1. Tube O.D ( $\phi D$ ), Tube Thickness(t).  
Tube Thickness Tolerance and Tube Material.
2. Tube Sheet Material, and Thickness( $T_1, T_2$ )
3. Hole Dia of Tube Sheet. ( $\phi H$ )
4. Tube Sheet Hole Pitch ( $P_1, P_2, P_3, P_4$ )
5. Effective Expansion Length. ( $A_1, A_2$ )
6. Tube Projection ( $E$ )
7. Expansion Reach. ( $B$ )
8. When Requiring Flare Expansion, Flare Angle ( $\theta^\circ$ )
9. Length of Straight Tube part ( $S$ )
10. Curve Radius of Bent Tube part ( $R$ )
11. Type of Expander. (AS-CB, AS-HB Type..... etc.)



AS-BK Type

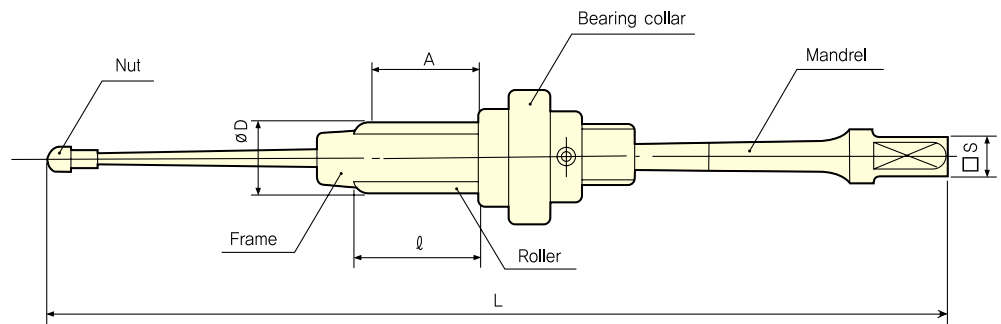


AS-CB Type



AS-HB Type

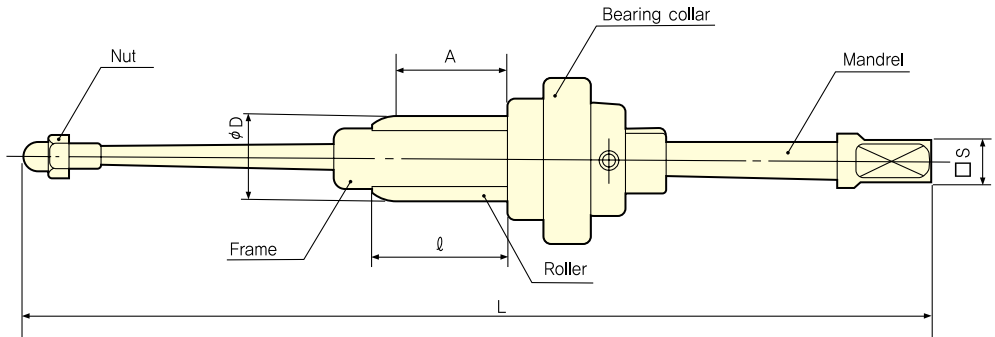
## AS-MB TYPE



Tool No.	Expansion Range D		Effective Roller Length A		Mandrel		
	Min. mm (in.)	Max. mm (in.)	$l = 25\text{mm (1")}$		No.	Shank Square S mm (in.)	Length L mm (in.)
Min. mm (in.)			Max. mm (in.)				
AS-MB-11	5.4 (0.213)	6.4 (0.252)	13 (0.512)	22 (0.866)	AM - 1	6.3 (1/4)	129 (5)
AS-MB-12	5.8 (0.228)	6.8 (0.268)					
AS-MB-13	6.2 (0.244)	7.2 (0.283)					
AS-MB-14	6.6 (0.260)	7.7 (0.303)	13 (0.512)	22 (0.866)	AM - 2	6.3 (1/4)	129 (5)
AS-MB-15	7.0 (0.276)	8.1 (0.319)					
AS-MB-16	7.4 (0.291)	8.5 (0.335)					
AS-MB-17	7.8 (0.307)	9.0 (0.354)	13 (0.512)	22 (0.866)	AM - 3	6.3 (1/4)	129 (5)
AS-MB-18	8.2 (0.323)	9.4 (0.370)					
AS-MB-19	8.6 (0.339)	9.8 (0.386)					
AS-MB-20	9.0 (0.354)	10.2 (0.402)					

# Expander size tables

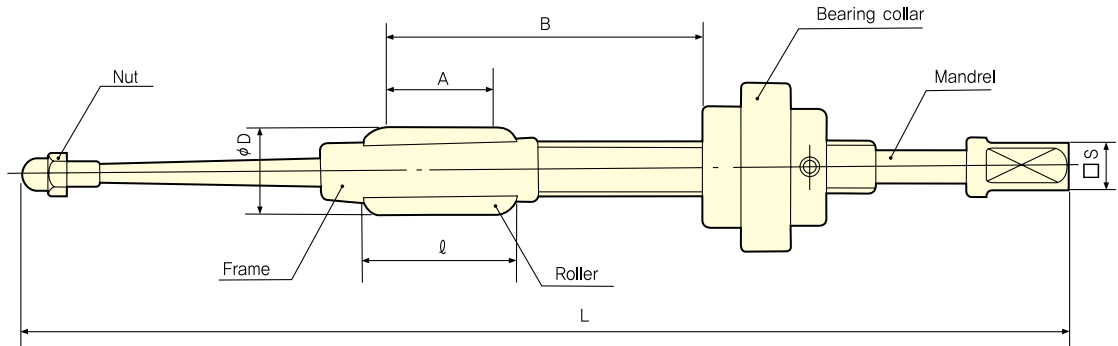
## AS-CB TYPE



Tool No.			Expansion Range D				Mandrel		
Roller Length $\ell$			Min. mm (in.)	Max			No.	Shank Square S mm (in.)	Length L mm (in.)
38mm (1-1/2")	57mm (2-1/4")	76mm (3")		Roller Length					
				38mm(1-1/2") mm (in.)	57mm(2-1/4") mm (in.)	76mm(3") mm (in.)			
CB-101	-	-	9.2 (0.362)	10.9 (0.429)	-	-	AC-1		
CB-103	-	-	10.0 (0.394)	11.7 (0.461)	-	-	AC-2	9.5 (3/8) 222 (8.7)	
CB-105	-	-	10.8 (0.425)	12.5 (0.492)	-	-			
CB-107	CB-207	-	11.6 (0.457)	13.5 (0.531)	13.2 (0.520)	-	AC-4	9.5 (3/8) 222 (8.7)	
CB-109	CB-209	-	12.4 (0.488)	14.3 (0.563)	14.0 (0.551)	-			
CB-111	CB-211	-	13.2 (0.520)	15.1 (0.594)	14.8 (0.583)	-			
CB-113	CB-213	CB-313	14.0 (0.551)	16.2 (0.638)	15.8 (0.622)	15.4 (0.606)	AC-6	9.5 (3/8) 222 (8.7)	
CB-115	CB-215	CB-315	14.8 (0.583)	17.0 (0.669)	16.6 (0.654)	16.2 (0.638)			
CB-117	CB-217	CB-317	15.6 (0.614)	17.8 (0.701)	17.4 (0.685)	17.0 (0.669)			
CB-119	CB-219	CB-319	16.4 (0.646)	18.9 (0.744)	18.4 (0.724)	18.0 (0.709)	AC-8	9.5 (3/8) 226 (8.9)	
CB-121	CB-221	CB-321	17.1 (0.673)	19.7 (0.776)	19.2 (0.756)	18.8 (0.740)			
CB-123	CB-223	CB-323	17.9 (0.705)	20.5 (0.807)	20.0 (0.787)	19.6 (0.771)			
CB-125	CB-225	CB-325	18.7 (0.736)	21.5 (0.846)	21.1 (0.831)	20.6 (0.811)	AC-10	9.5 (3/8) 226 (8.9)	
CB-127	CB-227	CB-327	19.5 (0.768)	22.3 (0.878)	21.9 (0.862)	21.4 (0.843)			
CB-129	CB-229	CB-329	20.3 (0.799)	23.1 (0.909)	22.6 (0.890)	22.1 (0.870)			
CB-131	CB-231	CB-331	21.3 (0.831)	23.9 (0.941)	23.4 (0.921)	22.9 (0.902)			
CB-132	CB-232	CB-332	21.5 (0.846)	25.0 (0.984)	24.4 (0.961)	23.8 (0.937)	AC-11	12.7 (1/2) 236 (9.3)	
CB-134	CB-234	CB-334	22.3 (0.878)	25.8 (1.016)	25.2 (0.992)	24.6 (0.969)			
CB-136	CB-236	CB-336	23.1 (0.909)	26.5 (1.043)	26.0 (1.024)	25.4 (1.001)			
CB-138	CB-238	CB-338	23.9 (0.941)	27.3 (1.075)	26.8 (1.055)	26.2 (1.031)			
CB-140	CB-240	CB-340	24.7 (0.972)	28.1 (1.106)	27.6 (1.087)	27.0 (1.063)			
CB-142	CB-242	CB-342	25.5 (1.004)	29.5 (1.161)	28.8 (1.134)	28.2 (1.110)	AC-12	12.7 (1/2) 236 (9.3)	
CB-144	CB-244	CB-344	26.3 (1.035)	30.3 (1.193)	29.6 (1.165)	29.0 (1.142)			
CB-146	CB-246	CB-346	27.1 (1.067)	31.1 (1.224)	30.4 (1.197)	29.8 (1.173)			
CB-148	CB-248	CB-348	27.9 (1.098)	31.9 (1.256)	31.2 (1.229)	30.6 (1.205)			
CB-150	CB-250	CB-350	28.7 (1.130)	32.7 (1.287)	32.0 (1.260)	31.4 (1.236)			
CB-152	CB-252	CB-352	29.5 (1.161)	34.1 (1.343)	33.3 (1.311)	32.6 (1.283)	AC-13	12.7 (1/2) 241 (9.5)	
CB-154	CB-254	CB-354	30.3 (1.193)	34.9 (1.374)	34.1 (1.343)	33.4 (1.315)			
CB-156	CB-256	CB-356	31.1 (1.224)	35.7 (1.406)	34.9 (1.374)	34.2 (1.346)			
CB-158	CB-258	CB-358	31.9 (1.256)	36.5 (1.437)	35.7 (1.406)	35.0 (1.378)			
CB-160	CB-260	CB-360	32.6 (1.283)	37.2 (1.465)	36.5 (1.437)	35.7 (1.406)			
CB-162	CB-262	CB-362	33.4 (1.315)	38.0 (1.496)	37.3 (1.469)	36.5 (1.437)			
-	CB-264	CB-364	35.1 (1.382)	-	39.7 (1.563)	38.9 (1.531)	AC-14	19.0 (3/4) 273 (10.7)	
-	CB-266	CB-366	36.6 (1.441)	-	41.3 (1.626)	40.5 (1.594)			
-	CB-268	CB-368	38.2 (1.504)	-	42.9 (1.689)	42.1 (1.657)			
-	CB-270	CB-370	40.7 (1.602)	-	46.1 (1.815)	45.3 (1.783)	AC-15	19.0 (3/4) 293 (11.5)	
-	CB-272	CB-372	43.9 (1.728)	-	49.2 (1.937)	48.4 (1.906)			
-	CB-274	CB-374	47.0 (1.850)	-	52.4 (2.063)	51.6 (2.031)			
-	CB-276	CB-376	49.5 (1.949)	-	55.6 (2.189)	54.8 (2.157)	AC-16	19.0 (3/4) 312 (12.3)	
-	CB-278	CB-378	52.7 (2.075)	-	58.8 (2.315)	58.0 (2.283)			
-	CB-280	CB-380	55.9 (2.201)	-	61.9 (2.437)	61.1 (2.406)			
-	CB-282	CB-382	58.2 (2.291)	-	65.1 (2.563)	64.3 (2.531)	AC-17	19.0 (3/4) 331 (13.0)	
-	CB-284	CB-384	61.4 (2.417)	-	68.3 (2.689)	67.5 (2.657)			
-	CB-286	CB-386	64.6 (2.543)	-	71.5 (2.815)	70.7 (2.783)			
-	CB-288	CB-388	67.1 (2.642)	-	75.4 (2.969)	74.5 (2.933)	AC-18	25.4 (1) 375 (14.8)	
-	CB-290	CB-390	70.3 (2.768)	-	78.6 (3.094)	77.7 (3.059)			
-	CB-292	CB-392	73.5 (2.894)	-	81.8 (3.220)	80.9 (3.185)	AC-19	25.4 (1) 375 (14.8)	
-	CB-294	CB-394	76.6 (3.016)	-	84.9 (3.343)	84.0 (3.307)			
-	CB-296	CB-396	79.8 (3.142)	-	88.1 (3.469)	87.3 (3.437)	AC-20	25.4 (1) 413 (16.3)	
-	CB-298	CB-398	84.6 (3.331)	-	94.5 (3.720)	93.7 (3.689)			
-	CB-300	CB-400	90.9 (3.579)	-	100.8 (3.969)	100.0 (3.937)			

# Expander size tables

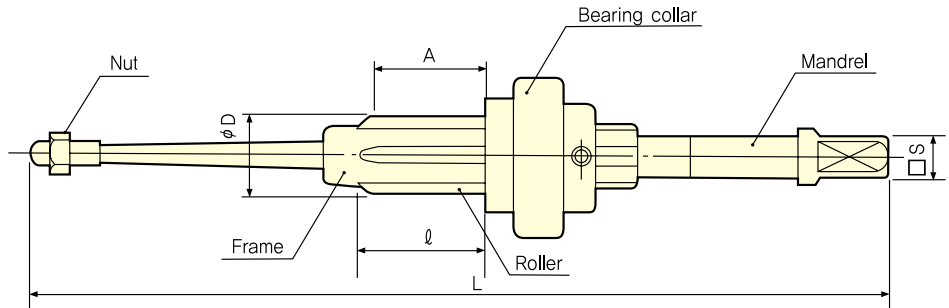
## AS-HB TYPE



Tool No.			Expansion Range D				Mandrel		
Roller Length $\ell$			Min. mm (in.)	Max			No.	Shank Square S mm (in.)	Length L mm (in.)
38mm (1-1/2")	57mm (2-1/4")	76mm (3")		Roller Length					
				38mm(1-1/2") mm (in.)	57mm(2-1/4") mm (in.)	76mm(3") mm (in.)			
HB-101	-	-	9.2 (0.362)	10.9 (0.429)	-	-	AH-1		
HB-103	-	-	10.0 (0.394)	11.7 (0.461)	-	-	AH-2	9.5 (3/8)	
HB-105	-	-	10.8 (0.425)	12.5 (0.492)	-	-			
HB-107	HB-207	-	11.6 (0.457)	13.5 (0.531)	13.2 (0.520)	-	AH-4	9.5 (3/8)	
HB-109	HB-209	-	12.4 (0.488)	14.3 (0.563)	14.0 (0.551)	-			
HB-111	HB-211	-	13.2 (0.520)	15.1 (0.594)	14.8 (0.583)	-			
HB-113	HB-213	HB-313	14.0 (0.551)	16.2 (0.638)	15.8 (0.622)	15.4 (0.606)	AH-6	9.5 (3/8)	
HB-115	HB-215	HB-315	14.8 (0.583)	17.0 (0.669)	16.6 (0.654)	16.2 (0.638)			
HB-117	HB-217	HB-317	15.6 (0.614)	17.8 (0.701)	17.4 (0.685)	17.0 (0.669)			
HB-119	HB-219	HB-319	16.4 (0.646)	18.9 (0.744)	18.4 (0.724)	18.0 (0.709)	AH-8	9.5 (3/8)	
HB-121	HB-221	HB-321	17.1 (0.673)	19.7 (0.776)	19.2 (0.756)	18.8 (0.740)			
HB-123	HB-223	HB-323	17.9 (0.705)	20.5 (0.807)	20.0 (0.787)	19.6 (0.771)			
HB-125	HB-225	HB-325	18.7 (0.736)	21.5 (0.846)	21.1 (0.831)	20.6 (0.811)	AH-10	9.5 (3/8)	
HB-127	HB-227	HB-327	19.5 (0.768)	22.3 (0.878)	21.9 (0.862)	21.4 (0.843)			
HB-129	HB-229	HB-329	20.3 (0.799)	23.1 (0.909)	22.6 (0.890)	22.1 (0.870)			
HB-131	HB-231	HB-331	21.3 (0.831)	23.9 (0.941)	23.4 (0.921)	22.9 (0.902)			
HB-132	HB-232	HB-332	21.5 (0.846)	25.0 (0.984)	24.4 (0.961)	23.8 (0.937)			
HB-134	HB-234	HB-334	22.3 (0.878)	25.8 (1.016)	25.2 (0.992)	24.6 (0.969)	AH-11	12.7 (1/2)	
HB-136	HB-236	HB-336	23.1 (0.909)	26.5 (1.043)	26.0 (1.024)	25.4 ( 1 )			
HB-138	HB-238	HB-338	23.9 (0.941)	27.3 (1.075)	26.8 (1.055)	26.2 (1.031)			
HB-140	HB-240	HB-340	24.7 (0.972)	28.1 (1.106)	27.6 (1.087)	27.0 (1.063)			
HB-142	HB-242	HB-342	25.5 (1.004)	29.5 (1.161)	28.8 (1.134)	28.2 (1.110)			
HB-144	HB-244	HB-344	26.3 (1.035)	30.3 (1.193)	29.6 (1.165)	29.0 (1.142)	AH-12	12.7 (1/2)	
HB-146	HB-246	HB-346	27.1 (1.067)	31.1 (1.224)	30.4 (1.197)	29.8 (1.173)			
HB-148	HB-248	HB-348	27.9 (1.098)	31.9 (1.256)	31.2 (1.229)	30.6 (1.205)			
HB-150	HB-250	HB-350	28.7 (1.130)	32.7 (1.287)	32.0 (1.260)	31.4 (1.236)			
HB-152	HB-252	HB-352	29.5 (1.161)	34.1 (1.343)	33.3 (1.311)	32.6 (1.283)			
HB-154	HB-254	HB-354	30.3 (1.193)	34.9 (1.374)	34.1 (1.343)	33.4 (1.315)	AH-13	12.7 (1/2)	
HB-156	HB-256	HB-356	31.1 (1.224)	35.7 (1.406)	34.9 (1.374)	34.2 (1.346)			
HB-158	HB-258	HB-358	31.9 (1.256)	36.5 (1.437)	35.7 (1.406)	35.0 (1.378)			
HB-160	HB-260	HB-360	32.6 (1.283)	37.2 (1.465)	36.5 (1.437)	35.7 (1.406)			
HB-162	HB-262	HB-362	33.4 (1.315)	38.0 (1.496)	37.3 (1.469)	36.5 (1.437)			
-	HB-264	HB-364	35.1 (1.382)	-	39.7 (1.563)	38.9 (1.531)	AH-14	19.0 (3/4)	
-	HB-266	HB-366	36.6 (1.441)	-	41.3 (1.626)	40.5 (1.594)			
-	HB-268	HB-368	38.2 (1.504)	-	42.9 (1.689)	42.1 (1.657)			
-	HB-270	HB-370	40.7 (1.602)	-	46.1 (1.815)	45.3 (1.783)	AH-15	19.0 (3/4)	
-	HB-272	HB-372	43.9 (1.728)	-	49.2 (1.937)	48.4 (1.906)			
-	HB-274	HB-374	47.0 (1.850)	-	52.4 (2.063)	51.6 (2.031)			
-	HB-276	HB-376	49.5 (1.949)	-	55.6 (2.189)	54.8 (2.157)	AH-16	19.0 (3/4)	
-	HB-278	HB-378	52.7 (2.075)	-	58.8 (2.315)	58.0 (2.283)			
-	HB-280	HB-380	55.9 (2.201)	-	61.9 (2.437)	61.1 (2.406)			
-	HB-282	HB-382	58.2 (2.291)	-	65.1 (2.563)	64.3 (2.531)	AH-17	19.0 (3/4)	
-	HB-284	HB-384	61.4 (2.417)	-	68.3 (2.689)	67.5 (2.657)			
-	HB-286	HB-386	64.6 (2.543)	-	71.5 (2.815)	70.7 (2.783)			
-	HB-288	HB-388	67.1 (2.642)	-	75.4 (2.969)	74.5 (2.933)	AH-18	25.4 (1)	
-	HB-290	HB-390	70.3 (2.768)	-	78.6 (3.094)	77.7 (3.059)			
-	HB-292	HB-392	73.5 (2.894)	-	81.8 (3.220)	80.9 (3.185)			
-	HB-294	HB-394	76.6 (3.016)	-	84.9 (3.343)	84.0 (3.307)	AH-19	25.4 (1)	
-	HB-296	HB-396	79.8 (3.142)	-	88.1 (3.469)	87.3 (3.437)			
-	HB-298	HB-398	84.6 (3.331)	-	94.5 (3.720)	93.7 (3.689)	AH-20	25.4 (1)	
-	HB-300	HB-400	90.9 (3.579)	-	100.8 (3.969)	100.0 (3.937)			

# Five-roller expander

## AS-CB R5 TYPE



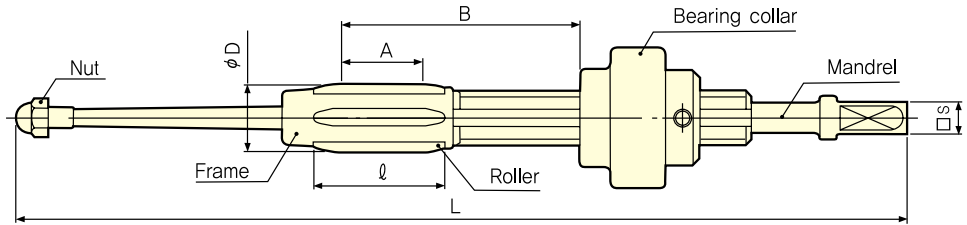
Tool No.			Expansion Range D				Effective Roller Length A						Mandrel		
Roller Length $l$			Min.	Max.			$l = 38$		$l = 57$		$l = 76$		No.	Shank S	Length L
38mm	57mm	76mm		$l = 38$	$l = 57$	$l = 76$	Min.	Max.	Min.	Max.	Min.	Max.			
CB107R5	-	-	11.5	13.3	-	-	14	33	-	-	-	-	RC5-2	9.5	232
CB109R5	-	-	12.3	14.1	-	-									
CB111R5	-	-	13.1	14.9	-	-							RC5-3	9.5	216
CB113R5	CB213R5	-	13.9	16.0	15.7	-							RC5-4	9.5	236
CB115R5	CB215R5	-	14.7	16.8	16.5	-									
CB117R5	CB217R5	-	15.5	17.8	17.5	-							RC5-5	9.5	244
CB119R5	CB219R5	CB319R5	16.3	18.7	18.3	17.9									
CB121R5	CB221R5	CB321R5	17.1	19.5	19.1	18.7									
CB123R5	CB223R5	CB323R5	17.9	20.5	20.1	19.6							RC5-7	9.5	230
CB125R5	CB225R5	CB325R5	18.7	21.5	21.1	20.6							RC5-8	9.5	241
CB127R5	CB227R5	CB327R5	19.5	22.3	21.9	21.4									
CB129R5	CB229R5	CB329R5	20.2	23.2	22.7	22.2	10	29					RC5-9	9.5	237
CB131R5	CB231R5	CB331R5	21.0	24.0	23.5	23.0									
-	CB232R5	CB332R5	21.4	-	24.1	23.6			29	48	48	67	RC5-10	12.7	250
-	CB234R5	CB334R5	22.2	-	24.9	24.4							RC5-11	12.7	256
-	CB236R5	CB336R5	23.0	-	25.9	25.4									
-	CB238R5	CB338R5	23.8	-	26.9	26.3							RC5-12	12.7	248
-	CB240R5	CB340R5	24.6	-	27.6	27.1									
-	CB242R5	CB342R5	25.4	-	28.6	28.0							RC5-13	12.7	241
-	CB244R5	CB344R5	26.2	-	29.4	28.8			29	46	48	65	RC5-14	12.7	249
-	CB246R5	CB346R5	27.0	-	30.4	29.9							RC5-15	12.7	261
-	CB248R5	CB348R5	27.8	-	31.2	30.7									
-	CB250R5	CB350R5	28.6	-	32.0	31.5									
-	CB252R5	CB352R5	29.4	-	33.2	32.7									
-	CB254R5	CB354R5	30.2	-	34.1	33.5									
-	CB256R5	CB356R5	31.0	-	34.9	34.3			27	44	46	63	RC5-16	12.7	246
-	CB258R5	CB358R5	31.8	-	35.7	35.1							RC5-17	12.7	262
-	CB260R5	CB360R5	32.5	-	36.8	36.1									
-	CB262R5	CB362R5	33.3	-	37.6	36.9									
-	CB264R5	CB364R5	34.9	-	39.7	39.0									
-	CB266R5	CB366R5	36.5	-	41.3	40.6							RC5-18	19.0	284
-	CB268R5	CB368R5	38.1	-	42.9	42.1			26	43	45	62	RC5-19	19.0	299
-	CB270R5	CB370R5	40.5	-	46.0	45.2									
-	CB272R5	CB372R5	43.7	-	49.2	48.4									
-	CB274R5	CB374R5	46.9	-	52.4	51.6			24	41					
-	-	CB376R5	49.3	-	-	54.8									
-	-	CB378R5	52.4	-	-	58.0							RC5-20	19.0	318
-	-	CB380R5	55.6	-	-	61.1									
-	-	CB382R5	57.9	-	-	64.3									
-	-	CB384R5	61.1	-	-	67.5									
-	-	CB386R5	64.3	-	-	70.7							RC5-21	19.0	342

For Best Result A "thin wall thrust collar" Should Be Used When Rolling 19 thru 22 Gauge Wall Tubes.



# Five-roller expander

## AS-HB R5 TYPE



Tool No.			Expansion Range D				Adjustable Range B						Effective Roller Length A			Mandrel		
Roller Length $l$			Min.	Max.			$l = 38$		$l = 57$		$l = 76$		$l = 38$	$l = 57$	$l = 76$	No.	Shank S	Length L
38mm	57mm	76mm		$l = 38$	$l = 57$	$l = 76$	Min.	Max.	Min.	Max.	Min.	Max.						
HB107R5	-	-	11.5	13.3	-	-	14	147	-	-	-	-	30	-	-	RH5-2	9.5	346
HB109R5	-	-	12.3	14.1	-	-												
HB111R5	-	-	13.1	14.9	-	-												
HB113R5	HB213R5	-	13.9	16.0	15.7	-												
HB115R5	HB215R5	-	14.7	16.8	16.5	-												
HB117R5	HB217R5	-	15.5	17.8	17.5	-												
HB119R5	HB219R5	HB319R5	16.3	18.7	18.3	17.9												
HB121R5	HB221R5	HB321R5	17.1	19.5	19.1	18.7												
HB123R5	HB223R5	HB323R5	17.9	20.5	20.1	19.6												
HB125R5	HB225R5	HB325R5	18.7	21.5	21.1	20.6	11	144	30	163	49	182	24	43	62			
HB127R5	HB227R5	HB327R5	19.5	22.3	21.9	21.4												
HB129R5	HB229R5	HB329R5	20.2	23.2	22.7	22.2												
HB131R5	HB231R5	HB331R5	21.0	24.0	23.5	23.0	10	143										
-	HB232R5	HB332R5	21.4	-	24.1	23.6			29	162	48	181		41	60			
-	HB234R5	HB334R5	22.2	-	24.9	24.4	-	-					-					
-	HB236R5	HB336R5	23.0	-	25.9	25.4												
-	HB238R5	HB338R5	23.8	-	26.9	26.3												
-	HB240R5	HB340R5	24.6	-	27.6	27.1												
-	HB242R5	HB342R5	25.4	-	28.6	28.0												
-	HB244R5	HB344R5	26.2	-	29.4	28.8												
-	HB246R5	HB346R5	27.0	-	30.4	29.9			29	160	48	179	-	38	57			
-	HB248R5	HB348R5	27.8	-	31.2	30.7												
-	HB250R5	HB350R5	28.6	-	32.0	31.5												
-	HB252R5	HB352R5	29.4	-	33.2	32.7												
-	HB254R5	HB354R5	30.2	-	34.1	33.5												
-	HB256R5	HB356R5	31.0	-	34.9	34.3												
-	HB258R5	HB358R5	31.8	-	35.7	35.1			27	158	46	177	-	35	54			
-	HB260R5	HB360R5	32.5	-	36.8	36.1												
-	HB262R5	HB362R5	33.3	-	37.6	36.9												
-	HB264R5	HB364R5	34.9	-	39.7	39.0												
-	HB266R5	HB366R5	36.5	-	41.3	40.6												
-	HB268R5	HB368R5	38.1	-	42.9	42.1			26	157	45	176	-	33	52			
-	HB270R5	HB370R5	40.5	-	46.0	45.2												
-	HB272R5	HB372R5	43.7	-	49.2	48.4												
-	HB274R5	HB374R5	46.9	-	52.4	51.6			24	155			-	30				
-	-	HB376R5	49.3	-	-	54.8												
-	-	HB378R5	52.4	-	-	58.0												
-	-	HB380R5	55.6	-	-	61.1												
-	-	HB382R5	57.9	-	-	64.3												
-	-	HB384R5	61.1	-	-	67.5												
-	-	HB386R5	64.3	-	-	70.7												

For Best Result A "thin wall thrust collar " Should Be Used When Rolling 19 thru 22 Gauge Wall Tubes.

# Expander size tables

## AS-CB TYPE

### Effective Roller Length A

Tool No.	Effective Roller Length A		Tool No.	Effective Roller Length A		Tool No.	Effective Roller Length A	
	Min. mm (in.)	Max. mm (in.)		Min. mm (in.)	Max. mm (in.)		Min. mm (in.)	Max. mm (in.)
CB-101-CB-105	14 (0.551)	33 (1.299)	-	-	-	-	-	-
CB-107-CB-111	13 (0.551)	32 (1.260)	CB-207-CB-211	32 (1.260)	51 (2.008)	-	-	-
CB-113-CB-117	13 (0.551)	32 (1.260)	CB-213-CB-217	32 (1.260)	51 (2.008)	CB-313-CB-317	51 (2.008)	70 (2.756)
CB-119-CB-123	11 (0.551)	30 (1.181)	CB-219-CB-223	30 (1.181)	49 (1.929)	CB-319-CB-323	49 (1.929)	68 (2.677)
CB-125-CB-131	10 (0.551)	29 (1.142)	CB-225-CB-231	29 (1.142)	48 (1.890)	CB-325-CB-331	48 (1.890)	67 (2.638)
CB-132-CB-140	10 (0.551)	27 (1.063)	CB-232-CB-240	29 (1.142)	46 (1.811)	CB-332-CB-340	48 (1.890)	65 (2.560)
CB-142-CB-150	8 (0.551)	25 (1.984)	CB-242-CB-250	27 (1.063)	44 (1.732)	CB-342-CB-350	46 (1.811)	63 (2.480)
CB-152-CB-162	7 (0.551)	24 (1.945)	CB-252-CB-262	26 (1.024)	43 (1.693)	CB-352-CB-362	45 (1.772)	62 (2.441)
-	-	-	CB-264-CB-268	26 (1.024)	43 (1.693)	CB-364-CB-368	45 (1.772)	62 (2.441)
-	-	-	CB-270-CB-274	24 (1.945)	41 (1.614)	CB-370-CB-374	43 (1.693)	60 (2.362)
-	-	-	CB-276-CB-280	24 (1.945)	41 (1.614)	CB-376-CB-380	43 (1.693)	60 (2.362)
-	-	-	CB-282-CB-286	24 (1.945)	41 (1.614)	CB-382-CB-386	43 (1.693)	60 (2.362)
-	-	-	CB-288-CB-292	21 (1.827)	38 (1.496)	CB-388-CB-392	40 (1.575)	57 (2.244)
-	-	-	CB-294-CB-296	21 (1.827)	38 (1.496)	CB-394-CB-396	40 (1.575)	57 (2.244)
-	-	-	CB-298-CB-300	21 (1.827)	38 (1.496)	CB-398-CB-400	40 (1.575)	57 (2.244)

## AS-HB TYPE

### Adjustable Range B and Effective Roller Length A

Tool No.	Adjustable Range B		Effective Roller Length A mm (in.)	Tool No.	Adjustable Range B		Effective Roller Length A mm (in.)	Tool No.	Adjustable Range B		Effective Roller Length A mm (in.)
	Min. mm (in.)	Max. mm (in.)			Min. mm (in.)	Max. mm (in.)			Min. mm (in.)	Max. mm (in.)	
HB-101~ HB-105	14 (0.551)	147 (5.787)	30 (1.181)	-	-	-	-	-	-	-	-
HB-107~ HB-111	13 (0.512)	146 (5.748)	27 (1.063)	HB-207~ HB-211	32 (1.260)	165 (6.496)	46 (1.811)	-	-	-	-
HB-113~ HB-117	13 (0.512)	146 (5.748)	27 (1.063)	HB-213~ HB-217	32 (1.260)	165 (6.496)	46 (1.811)	HB-313~ HB-317	51 (2.008)	184 (7.244)	65 (2.560)
HB-119~ HB-123	11 (0.433)	144 (5.669)	24 (0.945)	HB-219~ HB-223	30 (1.181)	163 (6.417)	43 (1.693)	HB-319~ HB-323	49 (1.929)	182 (7.165)	62 (2.441)
HB-125~ HB-131	10 (0.394)	143 (5.630)	22 (0.866)	HB-225~ HB-231	29 (1.142)	162 (6.378)	41 (1.614)	HB-325~ HB-331	48 (1.890)	181 (7.126)	60 (2.362)
HB-132~ HB-140	10 (0.394)	141 (5.551)	19 (0.748)	HB-232~ HB-240	29 (1.142)	160 (6.299)	38 (1.496)	HB-332~ HB-340	48 (1.890)	179 (7.047)	57 (2.244)
HB-142~ HB-150	8 (0.315)	139 (5.472)	16 (0.630)	HB-242~ HB-250	27 (1.063)	158 (6.220)	35 (1.378)	HB-342~ HB-350	46 (1.811)	177 (6.969)	54 (2.126)
HB-152~ HB-162	7 (0.276)	138 (5.433)	14 (0.551)	HB-252~ HB-262	26 (1.024)	157 (6.181)	33 (1.299)	HB-352~ HB-362	45 (1.772)	176 (6.929)	52 (2.047)
-	-	-	-	HB-264~ HB-268	26 (1.024)	157 (6.181)	33 (1.299)	HB-364~ HB-368	45 (1.772)	176 (6.929)	52 (2.047)
-	-	-	-	HB-270~ HB-274	24 (0.945)	155 (6.102)	30 (1.181)	HB-370~ HB-374	43 (1.693)	174 (6.850)	49 (1.929)
-	-	-	-	HB-276~ HB-280	24 (0.945)	155 (6.102)	30 (1.181)	HB-376~ HB-380	43 (1.693)	174 (6.850)	49 (1.929)
-	-	-	-	HB-282~ HB-286	24 (0.945)	155 (6.102)	30 (1.181)	HB-382~ HB-386	43 (1.693)	174 (6.850)	49 (1.929)
-	-	-	-	HB-288~ HB-292	21 (0.827)	152 (5.984)	25 (0.984)	HB-388~ HB-392	40 (1.575)	171 (6.732)	44 (1.732)
-	-	-	-	HB-294~ HB-296	21 (0.827)	152 (5.984)	25 (0.984)	HB-394~ HB-396	40 (1.575)	171 (6.732)	44 (1.732)
-	-	-	-	HB-298~ HB-300	21 (0.827)	152 (5.984)	25 (0.984)	HB-398~ HB-400	40 (1.575)	171 (6.732)	44 (1.732)

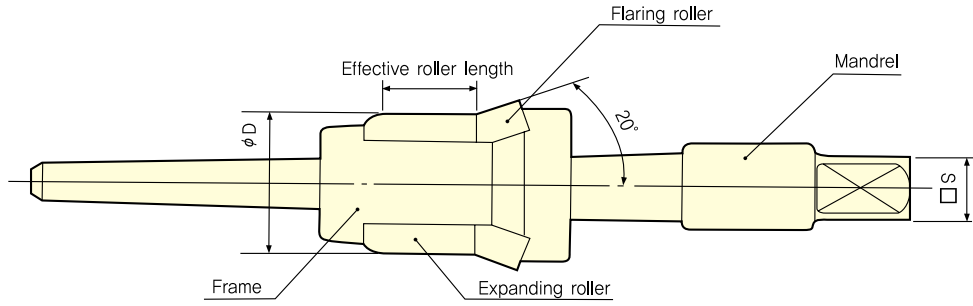
# Easy selection charts

## AS-CB & AS-HB TYPE

Tube Size			Min. Entry Dia. mm (in.)	Roller Length						Mandrel No.		
O.D. mm (in.)	Thickness			38mm(1-1/2")		57mm(2-1/4")		76mm(3")		CB	HB	Shank Square S mm (in.)
	mm	B.W.G	Max. Exp. Dia mm (in.)	Tool No.	Max. Exp. Dia mm (in.)	Tool No.	Max. Exp. Dia mm (in.)	Tool No.				
12.7 (1/2)	1.24	18	9.2 (0.362)	10.9 (0.429)	AS-CB(HB)-101					AC-1	AH-1	9.5 (3/8)
	1.07	19	10.0 (0.394)	11.7 (0.461)	AS-CB(HB)-103					AC-2	AH-2	
	0.89	20	10.0 (0.394)	11.7 (0.461)	AS-CB(HB)-103					AC-2	AH-2	
	0.71	22	10.8 (0.425)	12.5 (0.492)	AS-CB(HB)-105					AC-2	AH-2	
	0.64	23	10.8 (0.425)	12.5 (0.492)	AS-CB(HB)-105					AC-2	AH-2	
	0.56	24	10.8 (0.425)	12.5 (0.492)	AS-CB(HB)-105					AC-2	AH-2	
	0.51	25	10.8 (0.425)	12.5 (0.492)	AS-CB(HB)-105					AC-2	AH-2	
15.9 (5/8)	1.47	17	12.4 (0.488)	14.3 (0.563)	AS-CB(HB)-109	14.0 (0.551)	AS-CB(HB)-209			AC-4	AH-4	9.5 (3/8)
	1.24	18	12.4 (0.488)	14.3 (0.563)	AS-CB(HB)-109	14.0 (0.551)	AS-CB(HB)-209			AC-4	AH-4	
	1.07	19	13.2 (0.520)	15.1 (0.594)	AS-CB(HB)-111	14.8 (0.583)	AS-CB(HB)-211			AC-4	AH-4	
	0.89	20	13.2 (0.520)	15.1 (0.594)	AS-CB(HB)-111	14.8 (0.583)	AS-CB(HB)-211			AC-4	AH-4	
	0.81	21	14.0 (0.551)	16.2 (0.638)	AS-CB(HB)-113	15.8 (0.662)	AS-CB(HB)-213			AC-6	AH-6	
	0.71	22	14.0 (0.551)	16.2 (0.638)	AS-CB(HB)-113	15.8 (0.662)	AS-CB(HB)-213			AC-6	AH-6	
	0.64	23	14.0 (0.551)	16.2 (0.638)	AS-CB(HB)-113	15.8 (0.662)	AS-CB(HB)-213			AC-6	AH-6	
19.0 (3/4)	1.65	16	14.8 (0.583)	17.0 (0.669)	AS-CB(HB)-115	16.6 (0.654)	AS-CB(HB)-215			AC-6	AH-6	9.5 (3/8)
	1.47	17	14.8 (0.583)	17.0 (0.669)	AS-CB(HB)-115	16.6 (0.654)	AS-CB(HB)-215			AC-6	AH-6	
	1.24	18	15.6 (0.614)	17.8 (0.701)	AS-CB(HB)-117	17.4 (0.685)	AS-CB(HB)-217			AC-6	AH-6	
	1.07	19	15.6 (0.614)	17.8 (0.701)	AS-CB(HB)-117	17.4 (0.685)	AS-CB(HB)-217			AC-6	AH-6	
	0.89	20	16.4 (0.646)	18.9 (0.744)	AS-CB(HB)-119	18.4 (0.724)	AS-CB(HB)-219	18.0 (0.709)	AS-CB(HB)-319	AC-8	AH-8	
	0.81	21	16.4 (0.646)	18.9 (0.744)	AS-CB(HB)-119	18.4 (0.724)	AS-CB(HB)-219			AC-8	AH-8	
										AC-8	AH-8	
22.2 (7/8)	2.41	13	16.4 (0.646)	18.9 (0.744)	AS-CB(HB)-119	18.4 (0.724)	AS-CB(HB)-219			AC-8	AH-8	9.5 (3/8)
	2.11	14	17.1 (0.673)	19.7 (0.776)	AS-CB(HB)-121	19.2 (0.756)	AS-CB(HB)-221			AC-8	AH-8	
	1.83	15	17.1 (0.673)	19.7 (0.776)	AS-CB(HB)-121					AC-8	AH-8	
	1.65	16	17.9 (0.705)	20.5 (0.807)	AS-CB(HB)-123	20.2 (0.787)	AS-CB(HB)-223			AC-8	AH-8	
	1.47	17	17.9 (0.705)	20.5 (0.807)	AS-CB(HB)-123	20.2 (0.787)	AS-CB(HB)-223			AC-8	AH-8	
	1.24	18	18.7 (0.736)	21.5 (0.846)	AS-CB(HB)-125	21.1 (0.831)	AS-CB(HB)-225	20.6 (0.811)	AS-CB(HB)-325	AC-10	AH-10	
	1.07	19	19.5 (0.768)	22.3 (0.878)	AS-CB(HB)-127	21.9 (0.862)	AS-CB(HB)-227	21.4 (0.843)	AS-CB(HB)-327	AC-10	AH-10	
	0.89	20	19.5 (0.768)	22.3 (0.878)	AS-CB(HB)-127	21.9 (0.862)	AS-CB(HB)-227	21.4 (0.843)	AS-CB(HB)-327	AC-10	AH-10	
										AC-10	AH-10	
25.4 (1)	2.77	12	18.7 (0.736)	21.5 (0.846)	AS-CB(HB)-125	21.1 (0.831)	AS-CB(HB)-225			AC-10	AH-10	9.5 (3/8)
	2.41	13	19.5 (0.768)	22.3 (0.878)	AS-CB(HB)-127	21.9 (0.862)	AS-CB(HB)-227			AC-10	AH-10	
	2.11	14	20.3 (0.799)	23.1 (0.909)	AS-CB(HB)-129	22.6 (0.890)	AS-CB(HB)-229			AC-10	AH-10	
	1.83	15	20.3 (0.799)	23.1 (0.909)	AS-CB(HB)-129	22.6 (0.890)	AS-CB(HB)-229			AC-10	AH-10	
	1.65	16	21.1 (0.831)	23.9 (0.941)	AS-CB(HB)-131	23.4 (0.921)	AS-CB(HB)-231			AC-10	AH-10	
	1.47	17	21.5 (0.846)	25.0 (0.984)	AS-CB(HB)-132	24.4 (0.961)	AS-CB(HB)-232	23.8 (0.937)	AS-CB(HB)-332	AC-11	AH-11	
	1.24	18	22.3 (0.878)	25.8 (1.016)	AS-CB(HB)-134	25.2 (0.992)	AS-CB(HB)-234	24.6 (0.969)	AS-CB(HB)-334	AC-11	AH-11	
	1.07	19	22.3 (0.878)	25.8 (1.016)	AS-CB(HB)-134	25.2 (0.992)	AS-CB(HB)-234	24.6 (0.969)	AS-CB(HB)-334	AC-11	AH-11	
28.6 (1-1/8)	3.05	11	21.1 (0.831)	23.9 (0.941)	AS-CB(HB)-131					AC-10	AH-10	9.5(3/8)
	2.77	12	21.5 (0.846)	25.0 (0.984)	AS-CB(HB)-132	24.4 (0.961)	AS-CB(HB)-232			AC-11	AH-11	
	2.41	13	22.3 (0.878)	25.8 (1.016)	AS-CB(HB)-134	25.2 (0.992)	AS-CB(HB)-234			AC-11	AH-11	
	2.11	14	23.1 (0.909)	26.5 (1.043)	AS-CB(HB)-136	26.0 (1.024)	AS-CB(HB)-236	25.4 (1.000)	AS-CB(HB)-336	AC-11	AH-11	
	1.83	15	23.9 (0.941)	27.3 (1.075)	AS-CB(HB)-138	26.8 (1.055)	AS-CB(HB)-238	26.2 (1.031)	AS-CB(HB)-338	AC-11	AH-11	
	1.65	16	23.9 (0.941)	27.3 (1.075)	AS-CB(HB)-138	26.8 (1.055)	AS-CB(HB)-238			AC-11	AH-11	
	1.47	17	24.7 (0.972)	28.1 (1.106)	AS-CB(HB)-140	27.6 (1.087)	AS-CB(HB)-240	27.0 (1.063)	AS-CB(HB)-340	AC-11	AH-11	
	1.24	18	24.7 (0.972)	28.1 (1.106)	AS-CB(HB)-140	27.6 (1.087)	AS-CB(HB)-240	27.0 (1.063)	AS-CB(HB)-340	AC-11	AH-11	
	1.07	19	25.5 (1.004)	29.5 (1.161)	AS-CB(HB)-142	28.8 (1.134)	AS-CB(HB)-242	28.2 (1.110)	AS-CB(HB)-342	AC-12	AH-12	
31.8 (1-1/4)	3.40	10	23.1 (0.909)	26.5 (1.043)	AS-CB(HB)-136					AC-11	AH-11	12.7 (1/2)
	3.05	11	23.9 (0.941)	27.3 (1.075)	AS-CB(HB)-138					AC-11	AH-11	
	2.77	12	24.7 (0.972)	28.1 (1.106)	AS-CB(HB)-140	27.6 (1.087)	AS-CB(HB)-240			AC-11	AH-11	
	2.41	13	25.5 (1.004)	29.5 (1.161)	AS-CB(HB)-142	28.8 (1.134)	AS-CB(HB)-242	28.2 (1.110)	AS-CB(HB)-342	AC-12	AH-12	
	2.11	14	26.3 (1.035)	30.3 (1.193)	AS-CB(HB)-144	29.6 (1.165)	AS-CB(HB)-244	29.0 (1.142)	AS-CB(HB)-344	AC-12	AH-12	
	1.83	15	27.1 (1.067)	31.1 (1.224)	AS-CB(HB)-146	30.4 (1.197)	AS-CB(HB)-246	29.8 (1.173)	AS-CB(HB)-346	AC-12	AH-12	
	1.65	16	27.1 (1.067)	31.1 (1.224)	AS-CB(HB)-146	30.4 (1.197)	AS-CB(HB)-246	29.8 (1.173)	AS-CB(HB)-346	AC-12	AH-12	
	1.47	17	27.9 (1.098)	31.9 (1.256)	AS-CB(HB)-148	31.2 (1.228)	AS-CB(HB)-248	30.6 (1.205)	AS-CB(HB)-348	AC-12	AH-12	
	1.24	18	27.9 (1.098)	31.9 (1.256)	AS-CB(HB)-148	31.2 (1.228)	AS-CB(HB)-248	30.6 (1.205)	AS-CB(HB)-348	AC-12	AH-12	
34.9 (1-3/8)	3.76	9	25.5 (1.004)	29.5 (1.161)	AS-CB(HB)-142	28.8 (1.134)	AS-CB(HB)-242			AC-12	AH-12	12.7 (1/2)
	3.40	10	26.3 (1.035)	30.3 (1.193)	AS-CB(HB)-144	29.6 (1.165)	AS-CB(HB)-244			AC-12	AH-12	
	3.05	11	27.1 (1.067)	31.1 (1.224)	AS-CB(HB)-146	30.4 (1.197)	AS-CB(HB)-246			AC-12	AH-12	
	2.77	12	27.9 (1.098)	31.9 (1.256)	AS-CB(HB)-148	31.2 (1.228)	AS-CB(HB)-248	30.6 (1.205)	AS-CB(HB)-348	AC-12	AH-12	
	2.41	13	28.7 (1.130)	32.7 (1.287)	AS-CB(HB)-150	32.0 (1.260)	AS-CB(HB)-250	31.4 (1.236)	AS-CB(HB)-350	AC-12	AH-12	
	2.11	14	29.5 (1.161)	34.1 (1.343)	AS-CB(HB)-152	33.3 (1.311)	AS-CB(HB)-252	32.6 (1.283)	AS-CB(HB)-352	AC-13	AH-13	
	1.83	15	30.3 (1.193)	34.9 (1.374)	AS-CB(HB)-154	34.1 (1.343)	AS-CB(HB)-254	33.4 (1.315)	AS-CB(HB)-354	AC-13	AH-13	
	1.65	16	30.3 (1.193)	34.9 (1.374)	AS-CB(HB)-154	34.1 (1.343)	AS-CB(HB)-254	33.4 (1.315)	AS-CB(HB)-354	AC-13	AH-13	
	1.47	17	31.1 (1.224)	35.7 (1.406)	AS-CB(HB)-156	34.9 (1.374)	AS-CB(HB)-256	34.2 (1.346)	AS-CB(HB)-356	AC-13	AH-13	
1.24	18	31.1 (1.224)	35.7 (1.406)	AS-CB(HB)-156	34.9 (1.374)	AS-CB(HB)-256	34.2 (1.346)	AS-CB(HB)-356	AC-13	AH-13		
38.1 (1-1/2)	4.19	8	27.9 (1.098)	31.9 (1.256)	AS-CB(HB)-148	31.2 (1.228)	AS-CB(HB)-248			AC-12	AH-12	12.7 (1/2)
	3.76	9	28.7 (1.130)	32.7 (1.287)	AS-CB(HB)-150	32.0 (1.260)	AS-CB(HB)-250			AC-12	AH-12	
	3.40	10	29.5 (1.161)	34.1 (1.343)	AS-CB(HB)-152	33.0 (1.299)	AS-CB(HB)-252			AC-13	AH-13	
	3.05	11	30.3 (1.193)	34.9 (1.374)	AS-CB(HB)-154	34.1 (1.343)	AS-CB(HB)-254	33.4 (1.315)	AS-CB(HB)-354	AC-13	AH-13	
	2.77	12	31.1 (1.224)	35.7 (1.406)	AS-CB(HB)-156	34.9 (1.374)	AS-CB(HB)-256	34.2 (1.346)	AS-CB(HB)-356	AC-13	AH-13	
	2.41	13	31.9 (1.256)	36.5 (1.437)	AS-CB(HB)-158	35.7 (1.406)	AS-CB(HB)-258	35.0 (1.378)	AS-CB(HB)-358	AC-13	AH-13	
	2.11	14	32.6 (1.283)	37.2 (1.465)	AS-CB(HB)-160	36.5 (1.437)	AS-CB(HB)-260	35.7 (1.406)	AS-CB(HB)-360	AC-13	AH-13	
	1.83	15	33.4 (1.315)	38.0 (1.496)	AS-CB(HB)-162	37.3 (1.469)	AS-CB(HB)-262	36.5 (1.437)	AS-CB(HB)-362	AC-13	AH-13	
	1.65	16	33.4 (1.315)	38.0 (1.496)	AS-CB(HB)-162	37.3 (1.469)	AS-CB(HB)-262	36.5 (1.437)	AS-CB(HB)-362	AC-13	AH-13	

# Expander size tables

## AS-BK TYPE



Effective Roller Length	19mm	25.4mm	32mm	38mm	44.5mm	51mm	57mm	63.5mm	70mm	76mm	83mm	89mm	95mm	BK-6812	Example: Effective Roller Length No. Tool No. Expander Type		
	(3/4")	(1")	(1-1/4")	(1-1/2")	(1-3/4")	(2")	(2-1/4")	(2-1/2")	(2-3/4")	(3")	(3-1/4")	(3-1/2")	(3-3/4")				
Effective Roller Length No.	0	1	2	3	4	5	6	7	8	9	10	11	12				
Tool No.	Expansion Range D													Mandrel No.			Shank Square S mm(in.)
	Min mm (in.)	Max. mm (in.)												Drum	Header	Short	
28	20.6 (0.811)	24.2 (0.953)	4.0 (0.945)	23.8 (0.937)	23.6 (0.929)	23.4 (0.921)								DM-0S	HM-0S	12.7 (1/2)	
29	21.4 (0.843)	25.2 (0.992)	25.0 (0.984)	24.8 (0.976)	24.6 (0.969)	24.4 (0.961)											
30	22.2 (0.874)	26.0 (1.024)	25.8 (1.016)	25.6 (1.008)	25.4 (1.0)	25.2 (0.992)	25.0 (0.984)										
31	23.0 (0.906)	26.8 (1.055)	26.6 (1.047)	26.4 (1.039)	26.2 (1.031)	26.0 (1.024)	25.8 (1.016)							DM-1S	HM-1S	12.7 (1/2)	
32	23.8 (0.937)	27.6 (1.087)	27.4 (1.079)	27.2 (1.071)	27.0 (1.063)	26.8 (1.055)	26.6 (1.047)	26.3 (1.035)									
33	24.6 (0.969)	28.4 (1.118)	28.2 (1.110)	28.0 (1.102)	27.8 (1.094)	27.6 (1.087)	27.4 (1.079)	27.1 (1.067)	26.9 (1.059)								
34	25.4 (1.0)	30.0 (1.181)	29.8 (1.173)	29.6 (1.165)	29.4 (1.157)	29.2 (1.150)	29.0 (1.142)	28.7 (1.130)	28.5 (1.122)								
35	26.2 (1.031)	30.8 (1.213)	30.6 (1.205)	30.4 (1.197)	30.2 (1.189)	30.0 (1.181)	29.8 (1.173)	29.5 (1.161)	29.3 (1.154)	29.1 (1.146)				DM-2S	HM-2S	12.7 (1/2)	
36	27.0 (1.063)	31.6 (1.244)	31.4 (1.236)	31.2 (1.228)	30.9 (1.217)	30.7 (1.209)	30.5 (1.201)	30.3 (1.193)	30.1 (1.185)	29.9 (1.177)							
37	27.8 (1.094)	32.4 (1.276)	32.2 (1.268)	32.0 (1.260)	31.7 (1.248)	31.5 (1.240)	31.3 (1.232)	31.1 (1.224)	30.9 (1.217)	30.7 (1.209)	30.5 (1.201)						
38	28.6 (1.126)	33.2 (1.307)	33.0 (1.299)	32.8 (1.291)	32.5 (1.280)	32.3 (1.272)	32.1 (1.264)	31.9 (1.256)	31.7 (1.248)	31.5 (1.240)	31.3 (1.232)						
39	29.4 (1.157)	34.6 (1.362)	34.4 (1.354)	34.2 (1.346)	33.9 (1.335)	33.7 (1.327)	33.5 (1.319)	33.3 (1.311)	33.1 (1.303)	32.9 (1.295)	32.7 (1.287)	32.5 (1.280)					
40	30.2 (1.189)	35.4 (1.394)	35.2 (1.386)	35.0 (1.378)	34.7 (1.366)	34.5 (1.358)	34.3 (1.350)	34.1 (1.343)	33.9 (1.335)	33.7 (1.327)	33.5 (1.319)	33.3 (1.311)					
41	31.0 (1.220)	36.2 (1.425)	36.0 (1.417)	35.8 (1.409)	35.5 (1.398)	35.3 (1.390)	35.1 (1.382)	34.9 (1.374)	34.7 (1.366)	34.5 (1.358)	34.3 (1.350)	34.1 (1.343)	33.8 (1.331)				
42	31.8 (1.252)	37.0 (1.457)	36.8 (1.449)	36.6 (1.441)	36.3 (1.429)	36.1 (1.421)	35.9 (1.413)	35.7 (1.406)	35.5 (1.398)	35.3 (1.390)	35.1 (1.382)	34.9 (1.374)	34.6 (1.362)	DM-3	HM-3	S-3 4,5,6 12.7 (1/2)	
43	32.5 (1.280)	37.7 (1.484)	37.5 (1.476)	37.3 (1.469)	37.1 (1.461)	36.9 (1.453)	36.7 (1.445)	36.5 (1.437)	36.3 (1.429)	36.0 (1.417)	35.8 (1.409)	35.6 (1.402)	35.4 (1.394)				
44	33.3 (1.311)	38.5 (1.516)	38.3 (1.508)	38.1 (1.5)	37.9 (1.492)	37.7 (1.484)	37.5 (1.476)	37.3 (1.469)	37.1 (1.461)	36.8 (1.449)	36.6 (1.441)	36.4 (1.433)	36.2 (1.425)				
45	34.1 (1.343)	40.1 (1.579)	39.9 (1.571)	39.7 (1.563)	39.5 (1.555)	39.3 (1.547)	39.1 (1.539)	38.9 (1.531)	38.7 (1.524)	38.4 (1.512)	38.2 (1.504)	38.0 (1.496)	37.6 (1.488)	DM-4	HM-4	S-4,5 6,7 12.7 (1/2)	
48	34.9 (1.374)	41.0 (1.614)	40.8 (1.606)	40.6 (1.598)	40.4 (1.591)	40.2 (1.583)	40.0 (1.575)	39.8 (1.567)	39.6 (1.559)	39.3 (1.547)	39.1 (1.539)	38.9 (1.531)	38.7 (1.524)	DM-10	HM-10	SM-10 11 19.0 (3/4)	
49	36.5 (1.437)	42.6 (1.677)	42.4 (1.669)	42.2 (1.661)	42.0 (1.654)	41.8 (1.646)	41.6 (1.638)	41.4 (1.630)	41.1 (1.618)	40.9 (1.610)	40.7 (1.602)	40.5 (1.594)	40.1 (1.579)				
50	38.1 (1.5)	45.8 (1.803)	45.6 (1.795)	45.4 (1.787)	45.2 (1.780)	45.0 (1.772)	44.8 (1.764)	44.6 (1.756)	44.3 (1.744)	44.1 (1.736)	43.9 (1.728)	43.7 (1.720)	43.5 (1.713)				
51	39.7 (1.563)	47.4 (1.866)	47.2 (1.858)	47.0 (1.850)	46.8 (1.843)	46.6 (1.835)	46.4 (1.827)	46.2 (1.819)	45.9 (1.807)	45.7 (1.799)	45.5 (1.791)	45.3 (1.783)	45.1 (1.776)	DM-11	HM-11	SM-11 12,13 19.0 (3/4)	
52	41.3 (1.626)	49.0 (1.929)	48.8 (1.921)	48.6 (1.913)	48.4 (1.906)	48.2 (1.898)	47.9 (1.886)	47.7 (1.878)	47.5 (1.870)	47.3 (1.862)	47.1 (1.854)	46.9 (1.846)	46.7 (1.839)				
53	42.9 (1.689)	50.6 (1.992)	50.4 (1.984)	50.2 (1.976)	50.0 (1.969)	49.8 (1.961)	49.5 (1.949)	49.3 (1.941)	49.1 (1.933)	48.9 (1.925)	48.7 (1.917)	48.5 (1.909)	48.3 (1.894)				
54	44.5 (1.752)	52.2 (2.055)	52.0 (2.047)	51.9 (2.039)	51.6 (2.031)	51.4 (2.024)	51.1 (2.012)	50.9 (2.004)	50.7 (1.996)	50.5 (1.988)	50.3 (1.980)	50.1 (1.972)	49.9 (1.965)				
55	46.0 (1.811)	53.8 (2.118)	53.6 (2.110)	53.4 (2.102)	53.1 (2.091)	52.9 (2.083)	52.7 (2.075)	52.5 (2.067)	52.3 (2.059)	52.1 (2.051)	51.9 (2.043)	51.7 (2.035)	51.5 (2.028)	DM-12	HM-12	SM-12 13,14 19.0 (3/4)	
56	47.6 (1.874)	55.3 (2.177)	55.1 (2.169)	54.9 (2.161)	54.7 (2.154)	54.5 (2.146)	54.3 (2.138)	54.1 (2.130)	53.9 (2.122)	53.7 (2.114)	53.5 (2.106)	53.2 (2.094)	53.0 (2.087)				
57	49.2 (1.937)	56.9 (2.240)	56.7 (2.232)	56.5 (2.224)	56.3 (2.217)	56.1 (2.209)	55.9 (2.201)	55.7 (2.193)	55.5 (2.185)	55.3 (2.177)	55.1 (2.169)	54.8 (2.157)	54.6 (2.150)				



# Expander size tables

Effective Roller Length	19mm	25.4mm	32mm	38mm	44.5mm	51mm	57mm	63.5mm	70mm	76mm	83mm	89mm	95mm					
	(3/4")	(1")	(1-1/4")	(1-1/2")	(1-3/4")	(2")	(2-1/4")	(2-1/2")	(2-3/4")	(3")	(3-1/4")	(3-1/2")	(3-3/4")					
Effective Roller Length No.	0	1	2	3	4	5	6	7	8	9	10	11	12					
Tool No.	Expansion Range D													Mandrel No.			Shank Square S mm (in.)	
	Min . mm (in.)	Max. mm (in.)												Drum	Header	Short		
58	50.8 (2.0)	58.5 (2.303)	58.3 (2.295)	58.1 (2.287)	57.9 (2.280)	57.7 (2.272)	57.5 (2.264)	57.3 (2.256)	57.1 (2.248)	56.8 (2.236)	56.6 (2.228)	56.4 (2.220)	56.2 (2.213)	56.0 (2.205)	DM-13	HM-13	SM-13 14,15	19.0 (3/4)
59	52.4 (2.063)	60.1 (2.366)	59.9 (2.358)	59.7 (2.350)	59.5 (2.343)	59.3 (2.335)	59.1 (2.327)	58.9 (2.319)	58.6 (2.307)	58.4 (2.299)	58.2 (2.291)	58.0 (2.283)	57.8 (2.276)	57.6 (2.268)				
60	54.0 (2.126)	61.7 (2.429)	61.5 (2.421)	61.3 (2.413)	61.1 (2.406)	60.9 (2.398)	60.6 (2.386)	60.4 (2.378)	60.2 (2.370)	60.0 (2.362)	59.8 (2.354)	59.6 (2.346)	59.4 (2.339)	59.2 (2.331)				
61	55.6 (2.189)	63.3 (2.492)	63.1 (2.484)	62.9 (2.476)	62.7 (2.469)	62.5 (2.461)	62.2 (2.449)	62.0 (2.441)	61.8 (2.433)	61.6 (2.425)	61.4 (2.417)	61.2 (2.409)	61.0 (2.402)	60.8 (2.394)				
62	57.2 (2.252)		66.0 (2.598)	65.8 (2.591)	65.5 (2.579)	65.3 (2.571)	65.1 (2.563)	64.8 (2.551)	64.6 (2.543)	64.4 (2.535)	64.1 (2.524)	63.9 (2.516)	63.7 (2.508)	63.5 (2.5)	DM-14	HM-14	SM-14 15,16,17	19.0 (3/4)
63	58.7 (2.311)		67.6 (2.661)	67.4 (2.654)	67.1 (2.642)	66.9 (2.634)	66.7 (2.626)	66.4 (2.614)	66.2 (2.606)	65.9 (2.594)	65.7 (2.587)	65.5 (2.579)	65.2 (2.567)	65.0 (2.559)				
64	60.3 (2.374)		69.2 (2.724)	69.0 (2.717)	68.7 (2.705)	68.5 (2.697)	68.3 (2.689)	68.0 (2.677)	67.8 (2.669)	67.5 (2.657)	67.3 (2.650)	67.1 (2.642)	66.8 (2.630)	66.6 (2.622)				
65	61.9 (2.437)		70.8 (2.787)	70.5 (2.776)	70.3 (2.768)	70.1 (2.760)	69.8 (2.748)	69.6 (2.740)	69.4 (2.732)	69.1 (2.720)	68.9 (2.713)	68.7 (2.705)	68.4 (2.693)	68.2 (2.685)				
66	63.5 (2.5)		72.3 (2.846)	72.1 (2.839)	71.9 (2.831)	71.6 (2.819)	71.4 (2.811)	71.2 (2.803)	70.9 (2.791)	70.7 (2.783)	70.5 (2.776)	70.2 (2.764)	70.0 (2.756)	69.8 (2.748)				
67	65.1 (2.563)		73.9 (2.909)	73.7 (2.902)	73.5 (2.894)	73.2 (2.882)	73.0 (2.874)	72.8 (2.866)	72.5 (2.854)	72.3 (2.846)	72.0 (2.835)	71.8 (2.827)	71.6 (2.819)	71.4 (2.811)	DM-15	HM-15	SM-15 16,17,18	19.0 (3/4)
68	66.7 (2.626)		75.5 (2.972)	75.3 (2.965)	75.0 (2.953)	74.8 (2.945)	74.6 (2.937)	74.3 (2.925)	74.1 (2.917)	73.9 (2.909)	73.6 (2.898)	73.4 (2.890)	73.2 (2.882)	73.0 (2.874)	DM-16	HM-16	SS-16 17,18,19	25.4 (1)
69	68.3 (2.689)		77.1 (3.035)	76.9 (3.028)	76.6 (3.016)	76.4 (3.008)	76.2 (3.0)	75.9 (2.988)	75.7 (2.980)	75.5 (2.972)	75.2 (2.961)	75.0 (2.953)	74.8 (2.945)	74.6 (2.937)				
70	69.9 (2.752)		78.7 (3.098)	78.5 (3.091)	78.2 (3.079)	78.0 (3.071)	77.8 (3.063)	77.5 (3.051)	77.3 (3.043)	77.0 (3.031)	76.8 (3.024)	76.6 (3.016)	76.3 (3.004)	76.1 (2.996)				
71	71.4 (2.811)		80.3 (3.161)	80.1 (3.154)	79.8 (3.142)	79.6 (3.134)	79.4 (3.126)	79.1 (3.114)	78.9 (3.106)	78.6 (3.094)	78.4 (3.087)	78.2 (3.079)	77.9 (3.067)	77.7 (3.059)				
72	73.0 (2.874)		81.9 (3.224)	81.6 (3.213)	81.4 (3.205)	81.2 (3.197)	80.9 (3.185)	80.7 (3.177)	80.5 (3.169)	80.2 (3.157)	80.0 (3.150)	79.8 (3.142)	79.5 (3.130)	79.3 (3.122)				
73	74.6 (2.937)		83.5 (3.287)	83.2 (3.276)	83.0 (3.268)	82.8 (3.260)	82.5 (3.248)	82.3 (3.240)	82.1 (3.232)	81.8 (3.220)	81.6 (3.213)	81.4 (3.205)	81.1 (3.193)	80.9 (3.185)	DM-17	HM-17	SS-17 18,19,20	25.4 (1)
74	76.2 (3.0)		86.3 (3.398)	86.1 (3.390)	85.8 (3.378)	85.5 (3.366)	85.3 (3.358)	85.0 (3.346)	84.7 (3.335)	84.5 (3.327)	84.2 (3.315)	84.0 (3.307)	83.7 (3.295)	83.5 (3.287)	DM-18	HM-18	SS-18,19 20,21,22	25.4 (1)
75	77.8 (3.063)		87.9 (3.461)	87.6 (3.449)	87.4 (3.441)	87.1 (3.430)	86.9 (3.421)	86.6 (3.409)	86.3 (3.398)	86.1 (3.390)	85.8 (3.378)	85.5 (3.366)	85.3 (3.358)	85.0 (3.346)				
76	79.4 (3.126)		89.5 (3.524)	89.2 (3.512)	89.0 (3.504)	88.7 (3.492)	88.5 (3.484)	88.2 (3.472)	87.9 (3.461)	87.7 (3.453)	87.4 (3.441)	87.1 (3.429)	86.9 (3.421)	86.6 (3.409)				
77	81.0 (3.189)		91.0 (3.583)	90.8 (3.575)	90.6 (3.567)	90.3 (3.555)	90.0 (3.543)	89.8 (3.535)	89.5 (3.524)	89.2 (3.512)	89.0 (3.504)	88.7 (3.492)	88.4 (3.480)	88.2 (3.472)				
78	82.6 (3.252)		92.7 (3.650)	92.4 (3.638)	92.1 (3.626)	91.9 (3.618)	91.6 (3.606)	91.4 (3.598)	91.1 (3.587)	90.8 (3.575)	90.6 (3.567)	90.3 (3.555)	90.0 (3.543)	89.8 (3.535)				
79	84.1 (3.311)		94.3 (3.713)	94.0 (3.701)	93.7 (3.689)	93.5 (3.681)	93.2 (3.669)	92.9 (3.657)	92.7 (3.650)	92.4 (3.638)	92.1 (3.626)	91.9 (3.618)	91.6 (3.606)	91.3 (3.594)	DM-19	HM-19	SS-19,20 21,22,23	25.4 (1)
80	85.7 (3.374)		95.9 (3.776)	95.6 (3.764)	95.3 (3.752)	95.1 (3.744)	94.8 (3.732)	94.5 (3.720)	94.3 (3.713)	94.0 (3.701)	93.7 (3.689)	93.5 (3.681)	93.2 (3.669)	93.0 (3.661)	DM-20	HM-20	SS-20,21 22,23,24	25.4 (1)
81	87.3 (3.437)		97.4 (3.835)	97.2 (3.827)	96.9 (3.815)	96.6 (3.803)	96.4 (3.795)	96.1 (3.783)	95.8 (3.772)	95.6 (3.764)	95.3 (3.752)	95.1 (3.744)	94.8 (3.732)	94.6 (3.724)				
82	88.9 (3.5)		99.0 (3.898)	98.8 (3.890)	98.5 (3.878)	98.2 (3.866)	98.0 (3.858)	97.7 (3.846)	97.4 (3.835)	97.2 (3.827)	96.9 (3.815)	96.7 (3.807)	96.4 (3.795)	96.2 (3.787)				
83	90.5 (3.563)		100.6 (3.961)	100.3 (3.949)	100.1 (3.941)	99.8 (3.929)	99.6 (3.921)	99.3 (3.909)	99.0 (3.898)	98.8 (3.890)	98.5 (3.878)	98.2 (3.866)	98.0 (3.858)	97.7 (3.846)				
84	92.1 (3.626)		102.2 (4.024)	101.9 (4.012)	101.7 (4.004)	101.4 (3.992)	101.2 (3.984)	100.9 (3.972)	100.6 (3.961)	100.4 (3.953)	100.1 (3.941)	99.8 (3.929)	99.6 (3.921)	99.4 (3.913)				
85	93.7 (3.689)		103.8 (4.087)	103.5 (4.075)	103.3 (4.067)	103.0 (4.055)	102.7 (4.043)	102.5 (4.035)	102.2 (4.024)	101.9 (4.012)	101.7 (4.004)	101.4 (3.992)	101.1 (3.980)	100.8 (3.969)	DM-21	HM-21	SS-21,22 23,24,25	25.4 (1)
86	95.3 (3.752)		105.4 (4.150)	105.1 (4.138)	104.9 (4.130)	104.6 (4.118)	104.3 (4.106)	104.1 (4.098)	103.8 (4.087)	103.5 (4.075)	103.3 (4.067)	103.0 (4.055)	102.7 (4.043)	102.4 (4.031)	DM-22	HM-22	SS-22,23 24,25,26	25.4 (1)
87	96.8 (3.811)		107.0 (4.213)	106.7 (4.201)	106.4 (4.189)	106.2 (4.181)	105.9 (4.169)	105.7 (4.161)	105.4 (4.150)	105.1 (4.138)	104.9 (4.130)	104.6 (4.118)	104.3 (4.106)	104.0 (4.094)				
88	98.4 (3.874)		108.6 (4.276)	108.3 (4.264)	108.0 (4.252)	107.8 (4.244)	107.5 (4.232)	107.3 (4.224)	107.0 (4.213)	106.7 (4.201)	106.5 (4.193)	106.2 (4.181)	105.9 (4.169)	105.6 (4.157)				
89	100.0 (3.937)		110.2 (4.339)	109.9 (4.327)	109.6 (4.315)	109.4 (4.307)	109.1 (4.295)	108.8 (4.283)	108.6 (4.276)	108.3 (4.264)	108.0 (4.252)	107.8 (4.244)	107.5 (4.232)	107.2 (4.220)				
90	101.6 (4.000)		111.7 (4.398)	111.5 (4.390)	111.2 (4.378)	110.9 (4.366)	110.7 (4.358)	110.4 (4.346)	110.1 (4.335)	109.9 (4.327)	109.6 (4.315)	109.4 (4.307)	109.1 (4.295)	108.8 (4.283)				
91	103.2 (4.063)		113.3 (4.461)	113.1 (4.453)	112.8 (4.441)	112.5 (4.429)	112.3 (4.421)	112.0 (4.409)	111.8 (4.402)	111.5 (4.390)	111.2 (4.378)	111.0 (4.371)	110.7 (4.358)	110.4 (4.346)	DM-23	HM-23	SS-23,24 25,26,27	25.4 (1)
92	104.8 (4.126)		114.9 (4.524)	114.7 (4.516)	114.4 (4.504)	114.1 (4.492)	113.9 (4.484)	113.6 (4.472)	113.4 (4.465)	113.1 (4.453)	112.8 (4.441)	112.6 (4.433)	112.3 (4.421)	112.0 (4.409)	DM-24	HM-24	SS-24,25 26,27,28	25.4 (1)

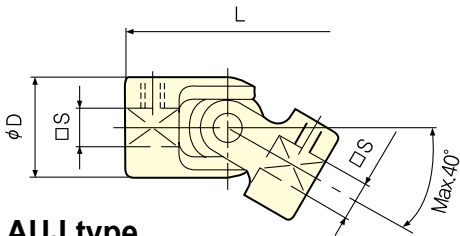
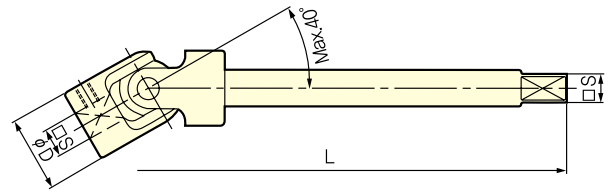
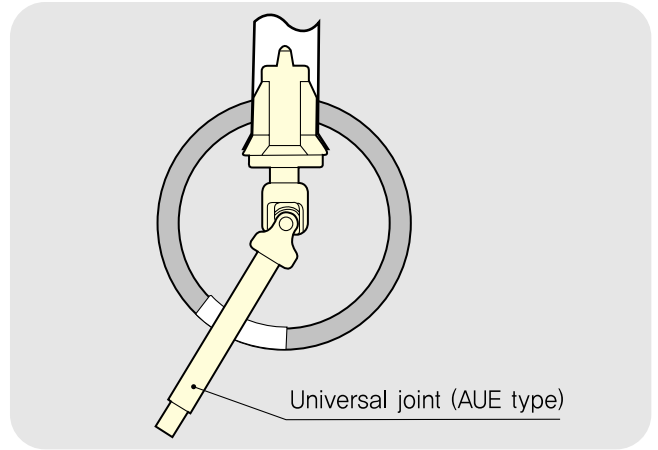
Note: 1. Standard Short Mandrels are designed for use with Tube Expanders up to effective roller length No. 4(44.5mm)  
 2. Tool No. 39 & larger sizes Tube Expanders have Retainer to hold Roller in Frame. For Tool No. 38 & Smaller sizes, no Retainer used.

A full range of accessories and tube working tools is available from Sungmo.  
Each accessory and tool has the same high standard Sungmo quality.

## Universal Joint

### AUE type

Tool No.	S	L	D
AUE-308	9.5 (3/8)	203 (8.0)	29 (1.142)
AUE-312		305 (12.0)	
AUE-408	12.7 (1/2)	203 (8.0)	33 (1.099)
AUE-412		305 (12.0)	
AUE-416		406 (16.0)	
AUE-612	19.0 (3/4)	305 (12.0)	43 (1.693)
AUE-616		406 (16.0)	
AUE-620		508 (20.0)	
AUE-812	25.4 (1)	305 (12.0)	54 (2.126)
AUE-816		406 (16.0)	
AUE-820		508 (20.0)	



### AUJ type

Tool No.	S	L	D
AUJ-33	9.5 (3/8)	62 (2.441)	29 (1.142)
AUJ-44	12.7 (1/2)	67 (2.638)	33 (1.299)
AUJ-66	19.0 (3/4)	95 (3.740)	43 (1.693)
AUJ-88	25.4 (1)	106 (4.173)	54 (2.126)

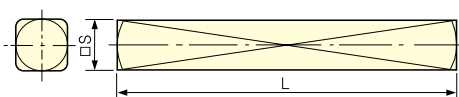
### AUC type

Tool No.	S	L	D
AUC-33	9.5 (3/8)	69 (2.717)	29 (1.142)
AUC-44	12.7 (1/2)	74 (2.913)	33 (1.299)
AUC-66	19.0 (3/4)	106 (4.173)	43 (1.693)
AUC-88	25.4 (1)	118 (4.646)	54 (2.126)

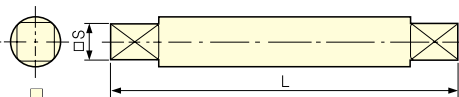
## Drive Shaft

Tool No.	S	L
ASD-34	9.5 (3/8)	102 (4.0)
ASD-312		305 (12.0)
ASD-44	12.7 (1/2)	102 (4.0)
ASD-412		305 (12.0)
ASD-64	19.0 (3/4)	102 (4.0)
ASD-612		305 (12.0)
ASD-84	25.4 (1)	102 (4.0)
ASD-812		305 (12.0)

Drive Shaft



Extension Bar



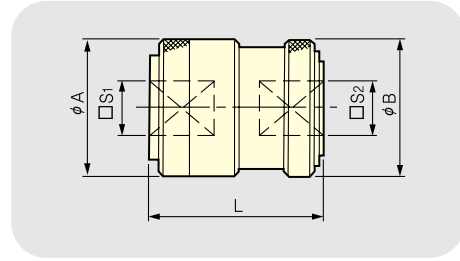
## Extension Bar

Tool No.	S	L
AEB-38	9.5 (3/8)	203 (8.0)
AEB-312		305 (12.0)
AEB-48	12.7 (1/2)	203 (8.0)
AEB-412		305 (12.0)
AEB-68	19.0 (3/4)	203 (8.0)
AEB-612		305 (12.0)
AEB-88	25.4 (1)	203 (8.0)
AEB-812		305 (12.0)

## Mandrel Couplings

These are engineered to facilitate rapid connection and disconnection of the expanders to the Tube Roller.

A "one-touch" design allows quick change with positive connection.



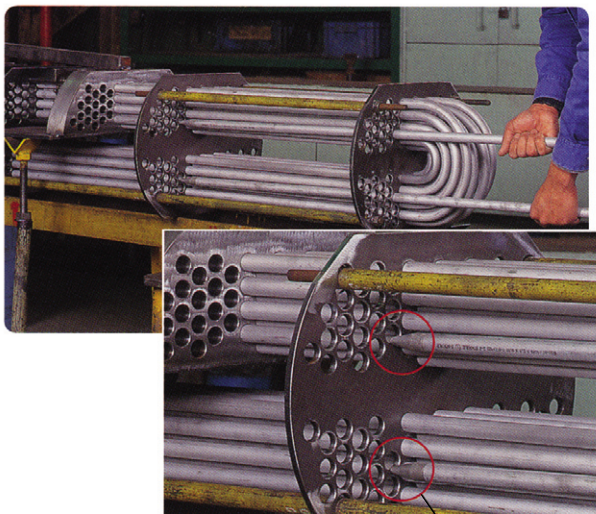
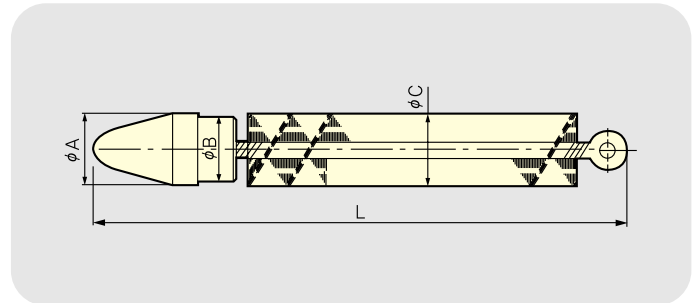
No.	AMC-32	AMC-33	AMC-43	AMC-44	AMC-63	AMC-64	AMC-66	AMC-86
□ S1	6.3	9.5	9.5	12.7	9.5	12.7	19	19
□ S2	9.5	9.5	12.7	12.7	19	19	19	25.4
A	26	29	29	32	43	43	48	48
B	29	29	32	32	48	48	48	60
L	37	41	41	41	53	53	66	88

mm

## Tube Guide

Tube guide has tapered aluminum pilot with a replaceable nylon brush used to guide tubes through tube sheets and support plate holes.

Speeds the assembly operation and prevents tube end damage during assembly. The nylon brush fits in the tube end, holding pilot firmly in place. Brush also cleans tube where it will be rolled. Pilot is easily removed by a slight twist.



Tube Guide

No.	Tube O.D	Thickness		A	B	C	L
		m.m	B.W.G				
1	25.4	0.8	21	25.4	23.7	25	205
2		1.24	18		22.4	25	
3		1.65	16		21.7	24	
4		2.11	14		20.9	24	
5	22.2	0.8	21	22.2	19.1	22	205
6		1.24	18		19.5	22	
7		1.65	16		18.7	21	
8		2.11	14		17.8	21	
9	19.0	0.8	21	19.0	17.1	20	205
10		1.24	18		16.1	20	
11		1.65	16		15.3	18	
12		2.11	14		12.7	18	
13	15.9	0.6	23	15.9	14.2	16	200
14		0.8	21		13.9	16	
15		1.24	18		13.0	16	
16		1.65	16		12.3	15	
17		2.11	14		11.9	14	

mm

## Tube Spear



mm

Tool No.	Tube I.D	Length	Tool No.	Tube I.D	Length
SPM-0914	I.D 9	9 ~ 10	SPM-1823	I.D 18	18 ~ 19
SPM-1015	I.D 10	10 ~ 11	SPM-1924	I.D 19	19 ~ 20
SPM-1116	I.D 11	11 ~ 12	SPM-2025	I.D 20	20 ~ 21
SPM-1217	I.D 12	12 ~ 13	SPM-2126	I.D 21	21 ~ 22
SPM-1318	I.D 13	13 ~ 14	SPM-2227	I.D 22	22 ~ 23
SPM-1419	I.D 14	14 ~ 15	SPM-2328	I.D 23	23 ~ 25
SPM-1520	I.D 15	15 ~ 16	SPM-2429	I.D 24	24 ~ 26
SPM-1621	I.D 16	16 ~ 17	SPM-2530	I.D 25	25 ~ 27
SPM-1722	I.D 17	17 ~ 18	SPM-2631	I.D 26	26 ~ 28

Note : Shank. 3/4" × 10G

## Tube Cutter



mm (in.)

Tool No.	Cutting Dia		Max Cutting Reach (in.)	Cutter No.	Shank S □	L
	MIN mm (in.)	MAX mm (in.)				
AS-TCV 10	10 (0.394)	14 (0.551)	75 (2.952)	TC-10	9.5 (3/8)	230 (9.05)
AS-TCV 11	11 (0.433)	15 (0.591)	75 (2.952)	TC-10	9.5 (3/8)	230 (9.05)
AS-TCV 12	12 (0.472)	16 (0.630)	75 (2.952)	TC-10	9.5 (3/8)	230 (9.05)
AS-TCV 13	13 (0.512)	17 (0.669)	75 (2.952)	TC-10	9.5 (3/8)	230 (9.05)
AS-TCV 14	14 (0.551)	18 (0.709)	75 (2.952)	TC-14	9.5 (3/8)	230 (9.05)
AS-TCV 15	15 (0.591)	19 (0.748)	75 (2.952)	TC-14	9.5 (3/8)	230 (9.05)
AS-TCV 16	16 (0.630)	20 (0.787)	75 (2.952)	TC-14	9.5 (3/8)	230 (9.05)
AS-TCV 17	17 (0.669)	21 (0.827)	75 (2.952)	TC-14	9.5 (3/8)	230 (9.05)
AS-TCV 18	18 (0.709)	22 (0.866)	75 (2.952)	TC-14	9.5 (3/8)	230 (9.05)
AS-TCV 19	19 (0.748)	23 (0.906)	75 (2.952)	TC-14	9.5 (3/8)	230 (9.05)
AS-TCV 20	20 (0.787)	25 (0.984)	100 (3.937)	TC-20	12.7 (1/2)	270 (10.63)
AS-TCV 21	21 (0.827)	26 (1.024)	100 (3.937)	TC-20	12.7 (1/2)	270 (10.63)
AS-TCV 22	22 (0.866)	27 (1.063)	100 (3.937)	TC-20	12.7 (1/2)	270 (10.63)
AS-TCV 23	23 (0.906)	28 (1.102)	100 (3.937)	TC-23	12.7 (1/2)	270 (10.63)
AS-TCV 24	24 (0.945)	29 (1.142)	100 (3.937)	TC-23	12.7 (1/2)	270 (10.63)
AS-TCV 25	25 (0.984)	30 (1.181)	100 (3.937)	TC-23	12.7 (1/2)	270 (10.63)





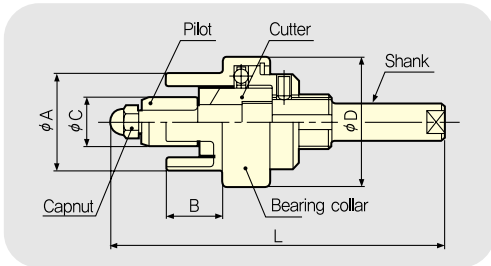
## Facing Tool

For flat facing (FF type cutter) of ends of tubes from 12.7mm (5/8 in.) to 57.1mm (2-1/4 in.) O.D. (standard range). A collar to rest against the tube sheet face gives constant tube end projection from the tube sheet.

Either electric or pneumatic drive can be employed.

Unless otherwise specified, tools up to 25.4mm (1 in.) O.D. are supplied with straight round shank, and above 31.8mm (1-1/4 in.) O.D. with morse taper shank.

For facing of tubes in excess of 57.1mm (2-1/4 in.) O.D. Sungmo will be pleased to design and quote on special tools for your particular requirements.

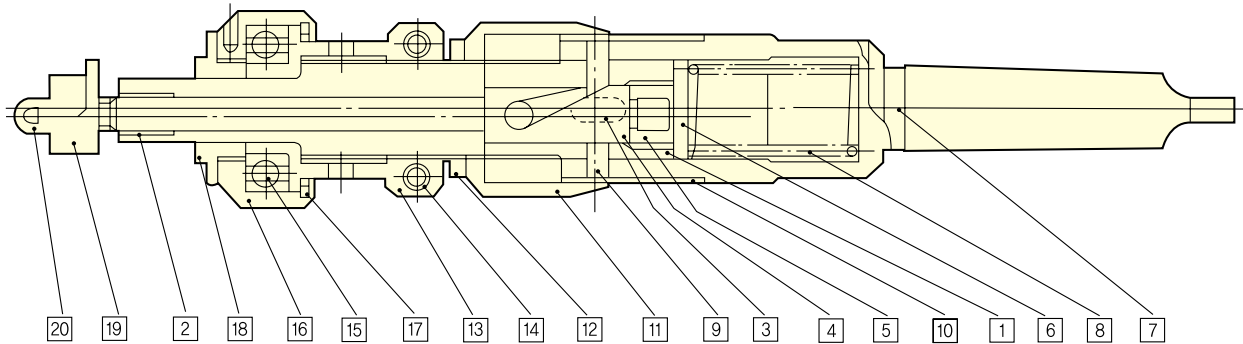


mm (in.)

Tube Size			Tool No.	Cutter Type	D	L	A	B	shank
O.D.	Thickness	B.W.G.		FF					
12.7 (1/2)	1.6	16	FC-4	FF-4	38(1.496)	111(4.370)	26(1.024)	19(0.748)	φ 9.5(3/8)
	1.5	17							
	1.2	18							
15.9 (5/8)	1.8	15	FC-5	FF-5	41(1.614)	111(4.370)	30(1.181)	19(0.748)	φ 12.7(1/2)
	1.6	16							
	1.5	17							
19.0 (3/4)	1.2	18	FC-6	FF-6	44(1.732)	113(4.449)	33(1.299)	19(0.748)	φ 12.7(1/2)
	2.4	13							
	2.1	14							
	1.8	15							
	1.6	16							
22.2 (7/8)	1.5	17	FC-7	FF-7	52(2.047)	113(4.449)	38(1.496)	19(0.748)	φ 12.7(1/2)
	1.2	18							
	2.1	14							
	1.8	15							
	1.6	16							
25.4 (1)	1.5	17	FC-8	FF-8	57(2.244)	131(5.157)	44(1.732)	25(0.984)	φ 12.7(1/2)
	1.2	18							
	3.4	10							
	3.0	11							
	2.8	12							
	2.4	13							
	2.1	14							
	1.8	15							
1.6	16								
31.8 (1 1/4)	1.5	17	FC-10	FF-10	62(2.441)	175(6.890)	49(1.929)	25(0.984)	MT2
	1.2	18							
	3.4	10							
	3.0	11							
	2.8	12							
38.1 (1 1/2)	2.4	13	FC-12	FF-12	71(2.795)	182(7.165)	55(2.165)	27.5(1.083)	MT2
	2.1	14							
	1.8	15							
44.5 (1 3/4)	1.6	16	FC-14	FF-14	81(3.189)	203(7.992)	65(2.559)	28(1.102)	MT3
	1.5	17							
	1.2	18							
50.8 (2)	3.4	10	FC-16	FF-16	91(3.583)	206(8.110)	71(2.795)	28(1.102)	MT3
	3.8	9							
	3.4	10							
57.1 (2 1/4)	4.2	8	FC-18	FF-18	100(3.937)	206(8.110)	80(3.150)	28(1.102)	MT3
	3.8	9							
	3.4	10							

Note : When ordering please specify Tool No., Cutter type, Tube specifications and tube pitch and layout.

# Grooving tool



## ❖ Names of parts

1 Spindle	6 Bearing Stopper	11 Thimble	16 Gauge head
2 Front bearing	7 Body	12 Lock nut	17 Stop ring
3 Key	8 Spring	13 Bushing retainer	18 Guide bushing
4 Cutter shaft	9 Cam pin	14 Hexagon socket bolt	19 Cutter
5 Rear bearing	10 Scale pipe	15 Radial ball bearing	20 Cap nut

## ❖ Tool specifications:

Specifications	Tool No.					
	GT- 102	GT - 122	GT-162	GT - 193	GT - 303	GT - 504
Hole diameter	10 ~ 14	12.7 ~ 17	16 ~ 21	19 ~ 32	30 ~ 54	50 ~ 78
Adjustable Range (Face to Groove)	4 ~ 20	4 ~ 20	4 ~ 20	6 ~ 30	6 ~ 40	6 ~ 60
Weight (Kgf)	1.1	1.1	1.2	2.2	3.7	8.6

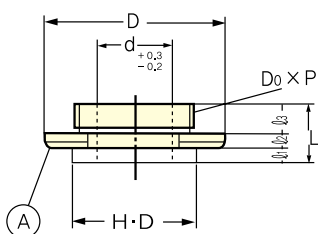
mm.

## ❖ GUIDE Bushing

The tool bushing accurately positions the tool in the hole of the workpiece. It is essential that the bushing dimensions match the workpiece specifications. When ordering please specify the exact hole diameter.

Bushing blanks may also be ordered for machining and

heat treating by the customer. Machining tolerance should be within 0.5mm, grinding tolerance should be -0.05 to -0.01mm. The bushing metal (carbon steel) should have a hardness of HRC-35 after heat treatment.



Tool No.	Hole Diameter	ℓ <sub>1</sub>	ℓ <sub>2</sub>	ℓ <sub>3</sub>	L	d.	D	D <sub>0</sub> × P
GT - 102	10~11.5 11.5~14	3	3	7.5	13.5	8.5 8.8	28	M22. P1.5
GT - 122	12.7~14 14~17	3	3	7.5	13.5	11.0 11.3	28	M22. P1.5
GT - 162	16~17 17~21	3	3	7.5	13.5	14.2 14.4	44	M22. P1.5
GT - 193	19~20 20~32	4	3	7.5	14.5	17.2 17.4	44	M28. P1.5
GT - 303	30~52	5	3	9.5	17.5	27.5	59	M35. P1.5
GT - 504	50~64 64~78	5	3	12.5	20.5	44.5	78 88	M50. P1.5

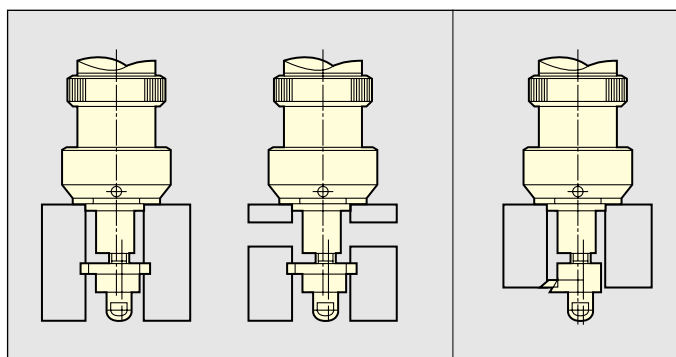
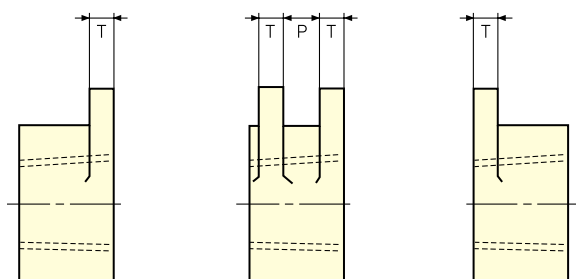
mm.

# Grooving cutter

mm.

Tool No.	CUTTER NO.	APPLICABLE HOLE DIA	MAX GROOVE DEPTH		TYPE OF BLADE	
			MINI-MAX	FOR MINI HOLE DIA	FOR MAX HOLE DIA	SINGLE T
		GT-102	H.D 10 ~ 11	10~11	1.0	0.5
H.D 11 ~ 12	11~12					
H.D 12 ~ 13	12~13					
H.D 13 ~ 14	13~14					
GT-122	H.D 12.7 ~ 14	12.7~14	1.5	0.8	3	3+5+3
	H.D 14 ~ 15	14~15	1.5	1.0		3+6+3
	H.D 15 ~ 16	15~16				
	H.D 16 ~ 17	16~17				
GT-162	H.D 16 ~ 17	16~17	1.5	1.0	3	3+5+3
	H.D 17 ~ 18	17~18				
	H.D 18 ~ 19	18~19				
	H.D 19 ~ 20	19~20				
	H.D 20 ~ 21	20~21				
GT-193	H.D 19 ~ 20	19~20	2.5	2.0	3	3+6+3
	H.D 20 ~ 22	20~22	2.5	1.5		
	H.D 22 ~ 24	22~24				
	H.D 24 ~ 26	26~28				
	H.D 26 ~ 28	28~30				
	H.D 28 ~ 30	30~32				
GT-303	H.D 30 ~ 34	30~34			4.0	2.0
	H.D 34 ~ 38	34~38	4	4+6+4		
	H.D 38 ~ 42	42~46	5			
	H.D 42 ~ 46	50~54				
	H.D 46 ~ 50	50~58				
	H.D 50 ~ 54	58~66				
GT-504	H.D 50 ~ 58	50~58	6.5	2.5	3	3+6+3
	H.D 58 ~ 66	64~70	3.5		4	4+6+4
	H.D 64 ~ 70	70~76				
	H.D 70 ~ 76	76~78				
	H.D 76 ~ 78					

## ▶ STANDARD CUTTER





Specifications in this catalogue may be subject to change without prior notice



**SUNGMO IND**

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