

# Hydrochucks BT



# HYDROCHUCKS

## Information

### Quick facts about SPV Spintec's hydrochucks

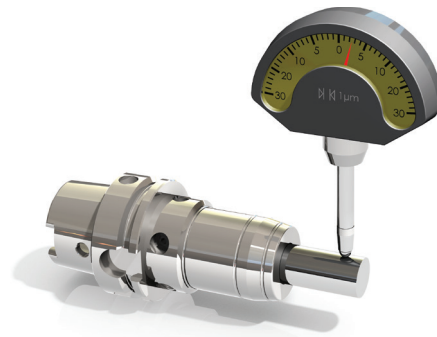
- High clamping force, 320 Nm at a Ø20 mm shank in a standard hydrochuck.
- Runout accuracy better than 0,003 mm (see below).
- Quick assembly method of the tool. No special equipment is needed.
- Standard balanced for 10 000 RPM (G6.3). Can be supplied fine balanced to 30 000 RPM (G2.5)
- The widest range of hydrochucks on the market. Available for all applications.
- If our standard assortment doesn't cover your needs, we can design custom chucks just for you.

### Benefits of using SPV Spintec's hydrochucks

- Up to 50% longer tool lifetime compared to conventional tool holder systems.
- Increased surface finish, thanks to the solid fastening of the tool shaft.
- Permits machining with much closer tolerances.
- Quicker and simpler tool changes.

### Runout accuracy

All of our different models of hydrochucks are made with a runout accuracy better than 0,003 mm. This allows for precision machining with closer tolerances. It also extends the tool lifetime



### Our different types of hydrochucks



▲ **HCF / HCF+**  
Short standard chuck



▲ **HCFL / HCFL+**  
Standard chuck with extended length



▲ **HCP+**  
Pen-chuck in two different lengths



▲ **HCPK+**  
Long tapered chuck

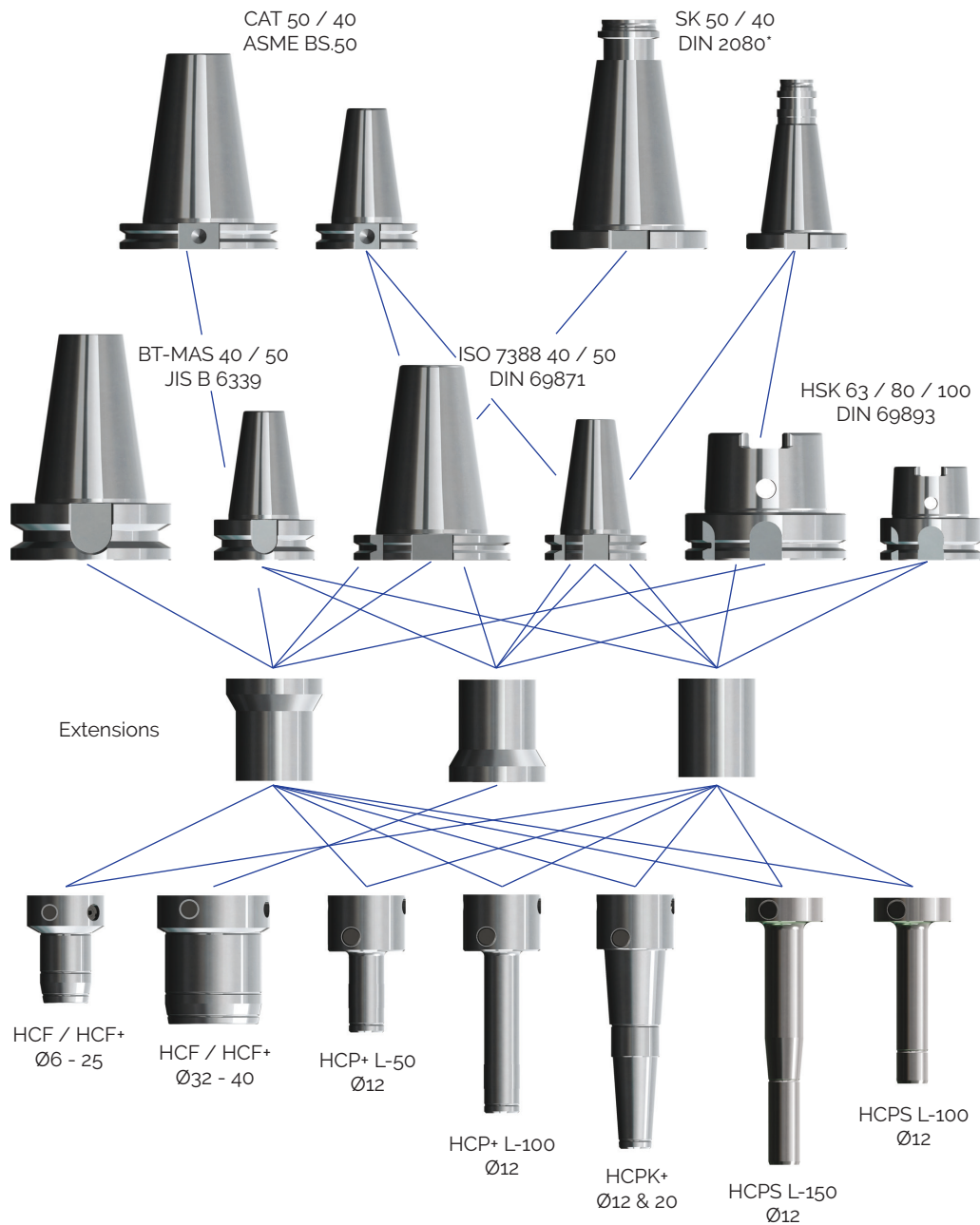


▲ **HCK+**  
Extra short and powerful chuck



▲ **HCPS**  
Extra long and narrow pen-chuck

## Optional combinations for SPV Spintec hydrochucks



\* Hydrochucks with DIN 2080 available on request.  
Please contact us for more information.

# HYDROCHUCKS

## The Plus-membrane

### Facts about SPV Spintec's developed milling-membrane - The Plus-membrane [+]

SPV Spintec's hexagonal milling membrane (+membrane) permits though, vibration free milling. A highly stable tool anchorage makes it possible to machine at greater feed rates and with greater axial and radial depths of cut than normally recommended.

#### Limitations of conventional hydrochucks

The limitation in machining with hydraulic chucks has frequently been the use of recommended cutting data for heavy duty milling.

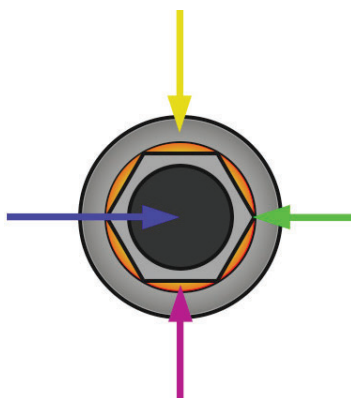
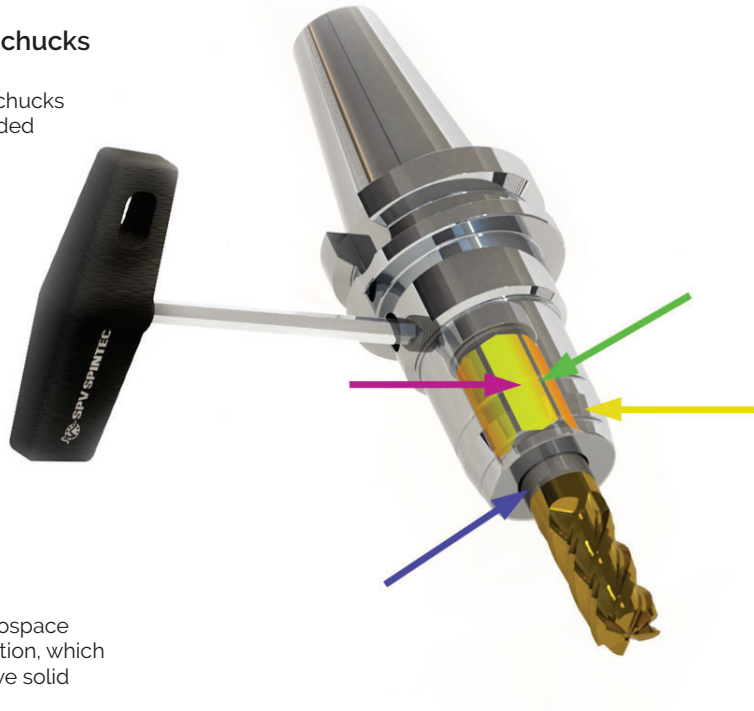
Customers have often been obliged to purchase specially shortened hydraulic milling-chucks with increased torque when they have needed to remove a large amount of material in the shortest possible time.

We have eliminated this limitation and offer our customers the opportunity of using our developed hydraulic milling-membrane for both milling and other operations, resulting in a better overall economy.

#### History of development

The development started when British Aerospace in England had problems with milling vibration, which lead to very short lifetime for their expensive solid carbide cutting tools.

British Aerospace tried several commercially available retention systems but didn't find a satisfactory solution. At that time SPV developed the hydrochucks with the hexagonal membrane which was found in tests at BA to multiply the period of contact several times over. In some cases it even enabled them to double both radial and axial cutting depths.



#### Yellow arrow

Outer body of the hydrochuck.

#### Blue arrow

The cutting tool shaft (drill, cutter etc.)

#### Purple arrow

The hydraulic chamber which combined with high hydraulic pressure provides a stable anchorage. The long, linear, thin wall gripping-surfaces protects the tool from flexing.

#### Green arrow

The remaining material between the hydraulic chambers creates reinforcement ribs, which minimize vibrations and stabilizes the membrane.

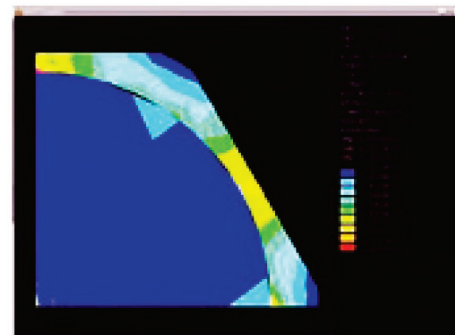
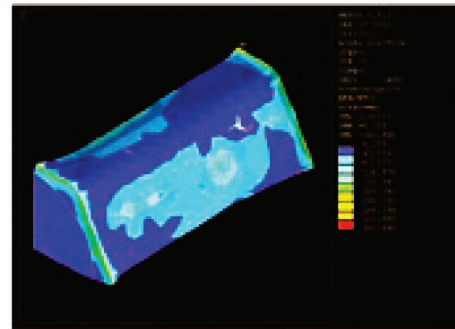
## Analysis

A calculation and simulation of loading cases using the Finite Element Method (FEM) from 3D-models was done in collaboration with the Mälardalen University College in Eskilstuna. This was to verify the results offered by the new design and to make a comparison with the traditional cylindrical membrane design in hydrochucks.

## Testing

A trial was done in the spring of 2003 at SECO tools in Fagersta, Sweden to attempt to verify any limits there might be on cutting data. An extract from the test report (P-1006, 2003-04-29 at SECO, Fagersta) shows the following.

- **Test sample:**  
Hydrochucks HCF+ with hexagonal membrane
- **Machining tools:**  
Solid 3-blade carbide metal cutters made by Jabro, with Tribon coating.  
Dimensions: Ø10 mm, Ø12 mm and Ø20 mm.
- **Work piece material:**  
Square bar, 75 x 75 mm made from heat treatable steel SS 2244-05, hardness 270 - 315 HB.



## Test summary

The results show that the hydrochucks equipped with a hexagonal membrane (The Plus-membrane) can manage up to twice the recommended cutting depth (both radial and axial) without tool chipping or vibrations that affects the surface finish. In practice, this means that the possible swarf yield has been multiplied by four.

### HCF+ chucks

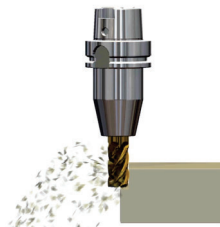
- Hydrochucks HCF+ with tools Ø10, Ø12 and Ø20 can manage the cutting data in Jabro's recommendation for coarse slab milling.
- 2 x the recommended axial cutting depth is quite OK, without any vibrations arising that could damage the cutting tool.
- 2 x the recommended radial cutting depth is quite OK.

## Specifications

**Coarse slab milling with rotational speed and feed rate to Jabro's recommendations:**

Recommended depth of cut:  
axial: 1 x tool diameter  
radial: 0,4 x tool diameter

Results in a chip area of:  
 $1 \times D \text{ mm} \times 0,4 \times D \text{ mm} = 0,4 \times D \text{ mm}^2$



**Coarse slab milling with rotational speed and feed rate to Jabro's recommendations:**

HCF+ tests with twice the recommended depth of cut, axial and radially.

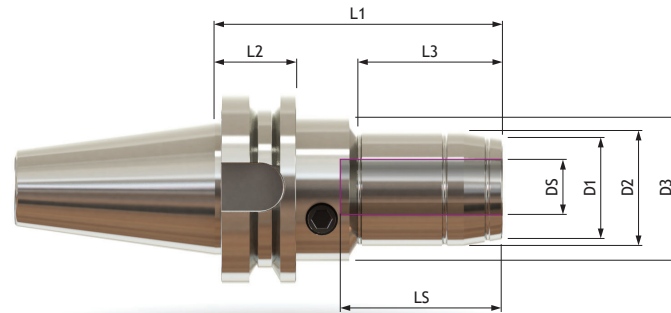
Results in a chip area of:  
 $1 \times D \text{ mm} \times 0,4 \times D \text{ mm} = 0,4 \times D \text{ mm}^2$



# HYDROCHUCKS

BT-MAS

HCF / HCF+



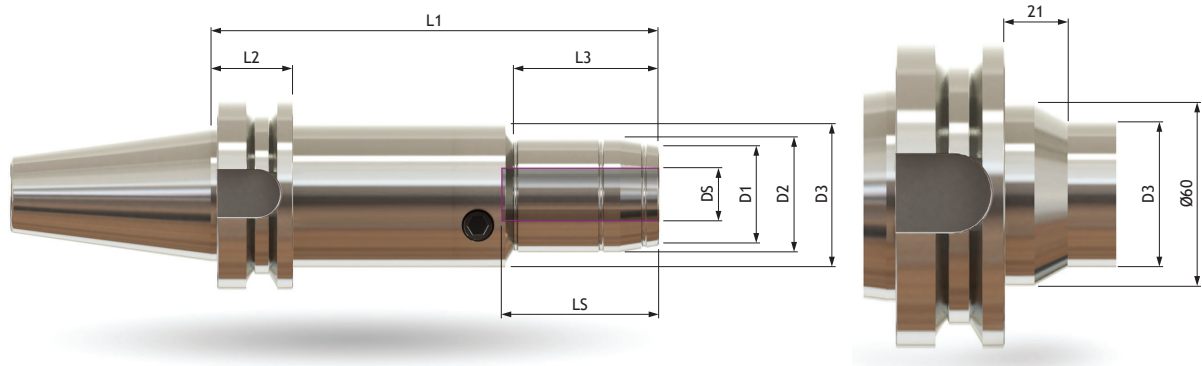
For chuck with Plus-membrane, specify + after art.no

DS Ømm	Mount type.	D1 Ømm	D2 Ømm	D3 Ømm	L1 mm	L2 mm	L3 mm	L5 mm	Art.no
<b>6</b>	BT 40	21,5	26	48	95	27	43,5	37,5	<b>56640</b>
	BT 50	21,5	26	48	106	38	43,5	37,5	<b>56650</b>
<b>8</b>	BT 40	23,5	28	48	95	27	43,5	37,5	<b>56641</b>
	BT 50	23,5	28	48	106	38	43,5	37,5	<b>56651</b>
<b>10</b>	BT 40	25,5	30	48	95	27	43,5	42,5	<b>56642</b>
	BT 50	25,5	30	48	106	38	43,5	42,5	<b>56652</b>
<b>12</b>	BT 40	27,5	32	48	95	27	44,5	47,5	<b>56643</b>
	BT 50	27,5	32	48	106	38	44,5	47,5	<b>56653</b>
<b>14</b>	BT 40	29,5	34	48	95	27	44,5	47,5	<b>56644</b>
	BT 50	29,5	34	48	106	38	44,5	47,5	<b>56654</b>
<b>16</b>	BT 40	33,5	38	48	95	27	47,5	52,5	<b>56645</b>
	BT 50	33,5	38	48	106	38	47,5	52,5	<b>56655</b>
<b>18</b>	BT 40	35,5	40	48	95	27	47,5	52,5	<b>56646</b>
	BT 50	35,5	40	48	106	38	47,5	52,5	<b>56656</b>
<b>20</b>	BT 40	37,5	42	48	95	27	47,5	52,5	<b>56647</b>
	BT 50	37,5	42	48	106	38	47,5	52,5	<b>56657</b>
<b>25</b>	BT 40	43,5	48	48	99	27	72	55	<b>56648</b>
	BT 50	43,5	48	48	110	38	72	55	<b>56658</b>
<b>32</b>	BT 40	55,5	60	70	108	27	57	65	<b>56649</b>
	BT 50	55,5	60	70	119	38	57	65	<b>56659</b>
<b>40 *</b>	BT 50	65	70	70	124	38	85	70	<b>56114+</b>

= dimension compatible with reduction sleeve.

\* = Ø40 is only available with BT-50 and Plus-membrane.

HCFL / HCFL+



BT 50 Ø6 - Ø25 appearance

For chuck with Plus-membrane, specify + after art.no

DS Ømm	Mount type.	D1 Ømm	D2 Ømm	D3 Ømm	L1 mm	L2 mm	L3 mm	L5 mm	Art.no
<b>6</b>	BT 40	21,5	26	48	135	27	43,5	37,5	<b>56720</b>
	BT 40	21,5	26	48	135 - 485	27	43,5	37,5	▲
	BT 50	21,5	26	48	160	38	43,5	37,5	<b>56730</b>
	BT 50	21,5	26	48	160 - 445	38	43,5	37,5	▲
<b>8</b>	BT 40	23,5	28	48	135	27	43,5	37,5	<b>56721</b>
	BT 40	23,5	28	48	135 - 485	27	43,5	37,5	▲
	BT 50	23,5	28	48	160	38	43,5	37,5	<b>56731</b>
	BT 50	23,5	28	48	160 - 445	38	43,5	37,5	▲
<b>10</b>	BT 40	25,5	30	48	135	27	43,5	42,5	<b>56722</b>
	BT 40	25,5	30	48	135 - 485	27	43,5	42,5	▲
	BT 50	25,5	30	48	160	38	43,5	42,5	<b>56732</b>
	BT 50	25,5	30	48	160 - 445	38	43,5	42,5	▲
<b>12</b> ▲	BT 40	27,5	32	48	135	27	44,5	47,5	<b>56723</b>
	BT 40	27,5	32	48	135 - 485	27	44,5	47,5	▲
	BT 50	27,5	32	48	160	38	44,5	47,5	<b>56733</b>
	BT 50	27,5	32	48	160 - 445	38	44,5	47,5	▲
<b>14</b>	BT 40	29,5	34	48	135	27	44,5	47,5	<b>56724</b>
	BT 40	29,5	34	48	135 - 485	27	44,5	47,5	▲
	BT 50	29,5	34	48	160	38	44,5	47,5	<b>56734</b>
	BT 50	29,5	34	48	160 - 445	38	44,5	47,5	▲
<b>16</b>	BT 40	33,5	38	48	135	27	47,5	52,5	<b>56725</b>
	BT 40	33,5	38	48	135 - 485	27	47,5	52,5	▲
	BT 50	33,5	38	48	160	38	47,5	52,5	<b>56735</b>
	BT 50	33,5	38	48	160 - 445	38	47,5	52,5	▲

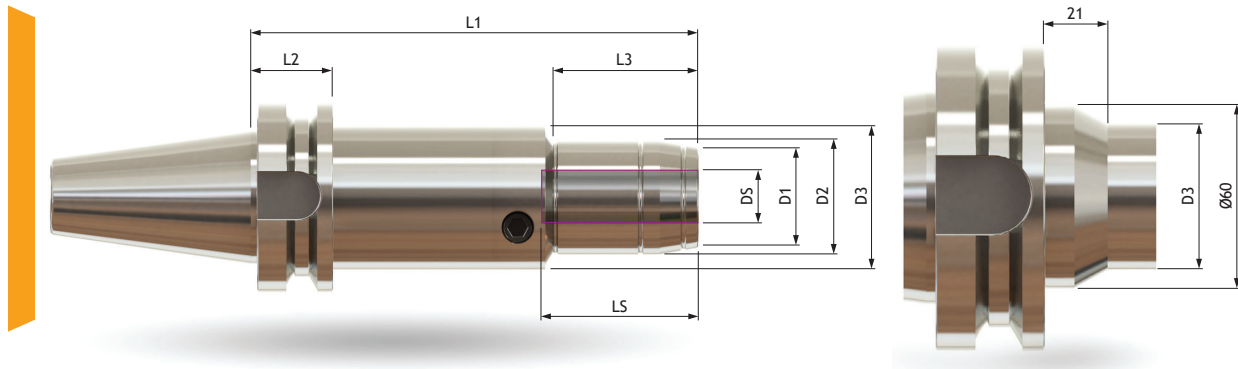
▲ = dimension compatible with reduction sleeve.

▲ = Specify art.no / L1 on order (L1 = length of your choice).

# HYDROCHUCKS

BT-MAS

HCFL / HCFL+



For chuck with Plus-membrane, specify + after art.no

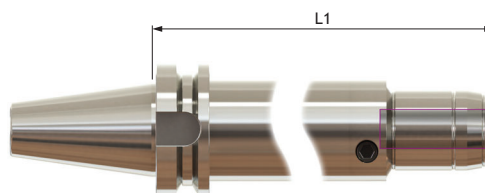
BT 50 Ø6 - Ø25 appearance

DS Ømm	Mount type.	D1 Ømm	D2 Ømm	D3 Ømm	L1 mm	L2 mm	L3 mm	L5 mm	Art.no
<b>18</b>	BT 40	35,5	40	48	135	27	47,5	52,5	<b>56726</b>
	BT 40	35,5	40	48	135 - 485	27	47,5	52,5	▲
	BT 50	35,5	40	48	160	38	47,5	52,5	<b>56736</b>
	BT 50	35,5	40	48	160 - 445	38	47,5	52,5	▲
<b>20</b> ▲	BT 40	37,5	42	48	135	27	47,5	52,5	<b>56727</b>
	BT 40	37,5	42	48	135 - 485	27	47,5	52,5	▲
	BT 50	37,5	42	48	160	38	47,5	52,5	<b>56737</b>
	BT 50	37,5	42	48	160 - 445	38	47,5	52,5	▲
<b>25</b>	BT 40	43,5	48	48	139	27	111	55	<b>56728</b>
	BT 40	43,5	48	48	139 - 485	27	-----	55	▲
	BT 50	43,5	48	48	164	38	105	55	<b>56738</b>
	BT 50	43,5	48	48	164 - 445	38	-----	55	▲
<b>32</b> ▲	BT 40	55,5	60	70	148	27	57	65	<b>56729</b>
	BT 40	55,5	60	70	148 - 485	27	57	65	▲
	BT 50	55,5	60	70	159	38	57	65	<b>56739</b>
	BT 50	55,5	60	70	159 - 445	38	57	65	▲

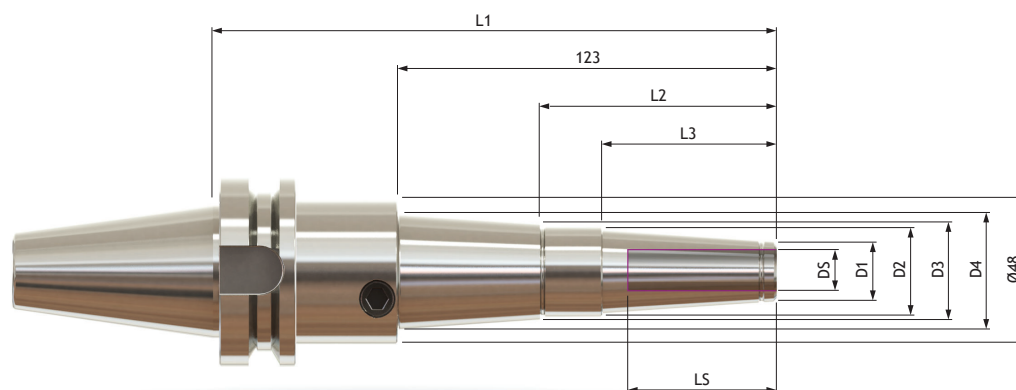
▲ = dimension compatible with reduction sleeve.

▲ = Specify art.no / L1 on order (L1 = length of your choice).

Choose your own length (L1) of HCFL / HCFL+. Specify Art.no / L1 on order.





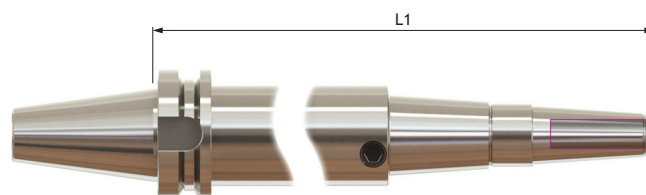


DS Ømm	Mount type.	D1 Ømm	D2 Ømm	D3 Ømm	D4 Ømm	L1 mm	L2 mm	L3 mm	L5 mm	Art.no
<b>12</b>	BT 40	20	30	32	40,5	185	76,8	57	44	<b>59143+</b>
	BT 40	20	30	32	40,5	225 - 485	76,8	57	44	
	BT 50	20	30	32	40,5	196	76,8	57	44	<b>59173+</b>
	BT 50	20	30	32	40,5	236 - 445	76,8	57	44	
<b>20</b>	BT 40	32	39	42	50,5	185	74,8	55	52	<b>59147+</b>
	BT 40	32	39	42	50,5	225 - 485	74,8	55	52	
	BT 50	32	39	42	50,5	196	74,8	55	52	<b>59177+</b>
	BT 50	32	39	42	50,5	236 - 445	74,8	55	52	

= dimension compatible with reduction sleeve.

= Specify art.no / L1 on order (L1 = length of your choice).

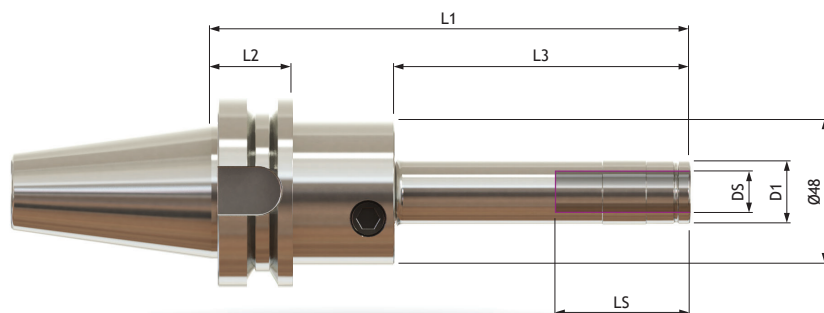
Choose your own length (L1) of HCPK+. Specify Art.no / L1 on order.



# HYDROCHUCKS

BT-MAS

HCP+



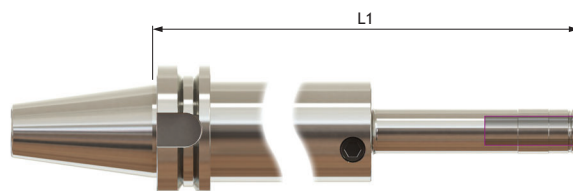
Short model

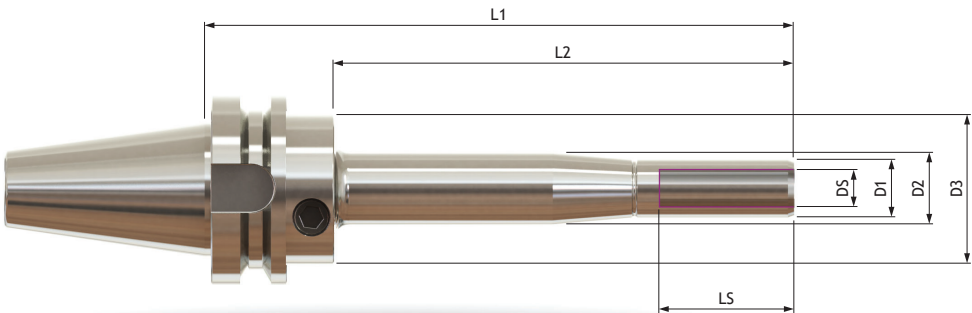


D5 Ømm	Mount type.	D1 Ømm	L1 mm	L2 mm	L3 mm	L5 mm	Art.no
12	BT 40	22,5	113	27	50	44	59103+
	BT 40	22,5	163	27	100	44	59113+
	BT 50	22,5	124	38	50	44	59153+
	BT 50	22,5	174	38	100	44	59163+

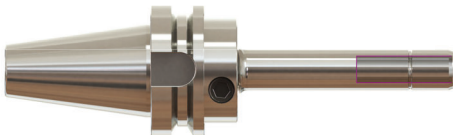
= dimension compatible with reduction sleeve.

Choose your own length (L1) of HCP+. Specify Art.no / L1 on order.



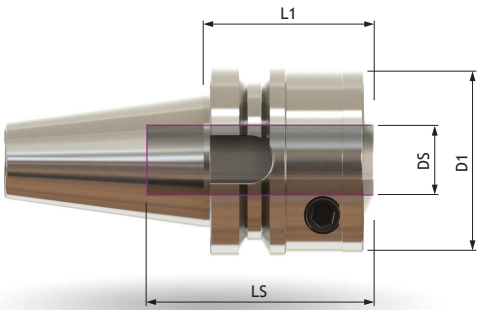


Short model



DS Ømm	Mount type.	D1 Ømm	D2 Ømm	D3 Ømm	L1 mm	L2 mm	L3 mm	L5 mm	Art.no
12	BT 40	19,5	-----	48	143	100	-----	42	<b>59603</b>
	BT 50	19,5	-----	48	154	100	-----	42	<b>59613</b>
	BT 40	19,5	24	48	193	150	52	42	<b>59703</b>
	BT 50	19,5	24	48	204	150	52	42	<b>59713</b>

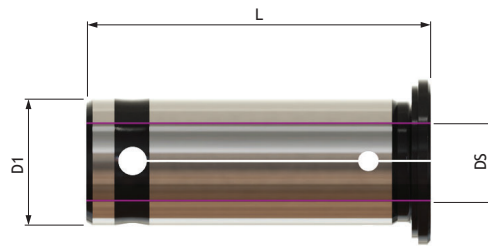
= dimension compatible with reduction sleeve.



HCK+ has an extended membrane which provides 600 Nm compared to 320 Nm on a standard Ø20 mm chuck.

DS Ømm	Mount type.	D1 Ømm	L1 mm	L5 mm	Art.no
20	BT 40	61	56	52,5	<b>66125+</b>

## Reduction Sleeves



Sealed sleeve with rubber stop.

Sleeves can be converted to unsealed by removing the rubber seal.

Other dimensions on request.

Reduction sleeves D = mm

D1 Ømm	DS Ømm	L mm	Art.no
<b>12</b>	3	44	<b>90003</b>
	4	44	<b>90004</b>
	5	44	<b>90005</b>
	6	44	<b>90006</b>
	8	44	<b>90008</b>
	10	44	<b>90010</b>
<b>20</b>	3	50	<b>90103</b>
	4	50	<b>90104</b>
	5	50	<b>90105</b>
	6	50	<b>90106</b>
	8	50	<b>90108</b>
	10	50	<b>90110</b>
	12	50	<b>90112</b>
	14	50	<b>90114</b>
<b>32</b>	6	63	<b>90206</b>
	8	63	<b>90208</b>
	10	63	<b>90210</b>
	12	63	<b>90212</b>
	14	63	<b>90214</b>
	16	63	<b>90216</b>
	18	63	<b>90218</b>
	20	63	<b>90220</b>
	25	63	<b>90225</b>

Reduction sleeves D = inch

D1 Ømm	DS Ømm	L mm	Art.no
<b>3/4"</b>	1/8"		<b>67960</b>
	5/32"		<b>67961</b>
	3/16"		<b>67962</b>
	1/4"		<b>67963</b>
	5/16"		<b>67964</b>
	3/8"		<b>67965</b>
	7/16"		<b>67966</b>
	1/2"		<b>67967</b>
<b>1 1/4"</b>	9/16"		<b>67968</b>
	5/8"		<b>67969</b>
	3/8"		<b>67980</b>
	1/2"		<b>67981</b>
	5/8"		<b>67982</b>
	3/4"		<b>67983</b>
	1"		<b>67984</b>

## Custom sleeves

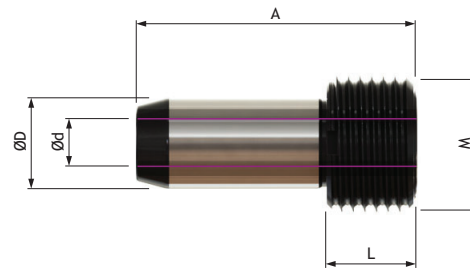
We also provide sleeves with custom clamping diameter (DS).

Please contact us for more info.

# HYDROCHUCKS

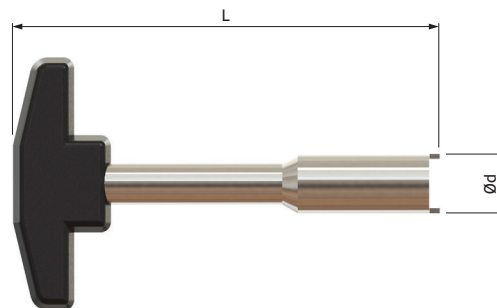
## Accessories

### Coolant-adaptor for HSK



For HSK-size	ØD mm	A mm	Ød mm	L mm	M	Art.no
HSK-A32 , HSK-E32 , HSK-F40	6	25,7	3,5	5,5	M10 x 1	HSKA.32.0100
HSK-A40 , HSK-E40 , HSK-F50	8	29	5	7,5	M12 x 1	HSKA.40.0120
HSK-A50 , HSK-E50 , HSK-F63	10	33	6,4	10	M16 x 1	HSKA.50.0160
HSK-A63 , HSK-E63 , HSK-F80	12	36,2	8	11,5	M18 x 1	HSKA.63.0180
HSK-A80 , HSK-E80 , HSK-F100	14	39,6	10	13,5	M20 x 1,5	HSKA.80.0200
HSK-A100 , HSK-E100 , HSK-F125	16	43,6	12	15,5	M24 x 1,5	HSKA.100.0240

### Key to coolant-adaptor for HSK



For HSK-size	ØD mm	L mm	Art.no
HSK-A32 , HSK-E32 , HSK-F40	9	110	CH.HSK.0320
HSK-A40 , HSK-E40 , HSK-F50	11	110	CH.HSK.0400
HSK-A50 , HSK-E50 , HSK-F63	15	120	CH.HSK.0500
HSK-A63 , HSK-E63 , HSK-F80	17	120	CH.HSK.0630
HSK-A80 , HSK-E80 , HSK-F100	18,5	130	CH.HSK.0800
HSK-A100 , HSK-E100 , HSK-F125	22	140	CH.HSK.1000

## HYDROCHUCKS

Customized hydrochuck solutions

Specially designed for you

SPV Spintec also manufactures hydrochucks in fully customized versions for e.g. odd machines that are not equipped with a standard spindle mount. We meet the customer's demands by designing and developing special chucks that fit the customer's application. We manufacture special chucks for both internal and external clamping. The chucks can be designed for holding a tool or as a precision fixture for accurate clamping of a workpiece.



# HYDROCHUCKS

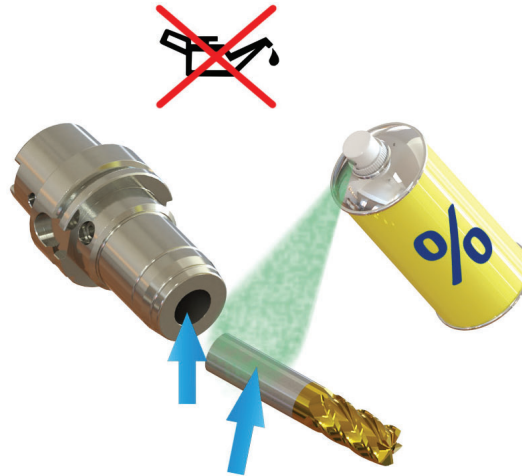
## Operating instructions

- **1. Working temperature**

Ideal and optimized working temperature is between 20° and 50°C. Do not store hydrochucks where the temperature could exceed 50°C.

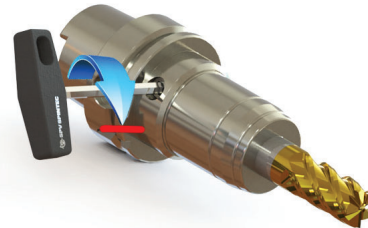
- **2. Cleaning**

It is very important that both the tool shaft and the inside of the hydrochuck are free from grease or other contamination. Use an alcohol based degreaser when cleaning the chuck and tool.



- **3. Tightening the membrane**

The screw must always be tightened to the fixed stop. No torque-key is needed. Never tighten the screw without a tool in the chuck, since there is a risk that the hydraulic chamber could be deformed.

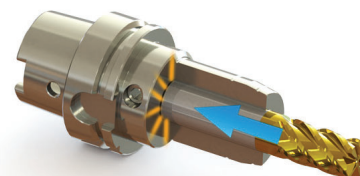


- **4. Tool insertion length**

The tool must be inserted to a fixed stop, to prevent the hydraulic chamber from being deformed by the pressure. When reduction sleeves are used, at least 60% of the tool shaft length must be inserted and clamped.

- **5. Service and repair**

If you experience that your hydrochuck does not clamp properly, this can be due to several issues. A common explanation is that the hydraulic piston seal is worn out. We always recommend sending the chuck to us for service or repair. Contact us for more info.



### Important information about tool shafts.

- **Hydrochucks with standard membrane - HCF / HCFL / HCPS**

For standard chucks from Ø6 to Ø20 mm, Weldon-shafts can be used directly in the chuck.  
Shaft tolerance = h6

- **Hydrochucks with The Plus-membrane - HCF+ / HCFL+ / HCP+ / HCPK+ / HCK+**

For chucks with The Plus-membrane (+) only cylindrical shafts must be used directly in the chuck.  
Shaft tolerance = h6

- **Reduction sleeves - (Not suitable for HCK+)**

Other types of tool shafts such as Weldon, Whistlenotch etc can be used in combination with a reduction sleeve in the hydrochuck.

### Torque specifications

Chuck for tool Ø mm	HCF / HCF+	HCK+	HCP+	HCPK+	HCPS
6	15 Nm				
8	20 Nm				
10	40 Nm				
12	80 Nm		80 Nm	80 Nm	80 Nm
14	110 Nm				
16	130 Nm				
18	190 Nm				
20	320 Nm	600 Nm		320 Nm	
25	400 Nm				
32	650 Nm	1 200 Nm			
40	1 200 Nm				



#### WARNING!

Disassembling and assembling a hydrochuck requires special tools and equipment.  
Always send the chuck to SPV Spintec representative if it needs to be repaired.