

Hydrochucks CAT



HYDROCHUCKS

Information

Quick facts about SPV Spintec's hydrochucks

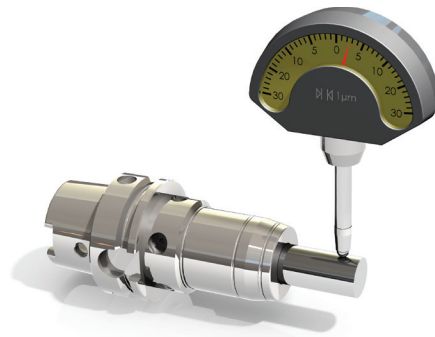
- High clamping force, 320 Nm at a Ø20 mm shank in a standard hydrochuck.
- Runout accuracy better than 0,003 mm (see below).
- Quick assembly method of the tool. No special equipment is needed.
- Standard balanced for 10 000 RPM (G6.3). Can be supplied fine balanced to 30 000 RPM (G2.5)
- The widest 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

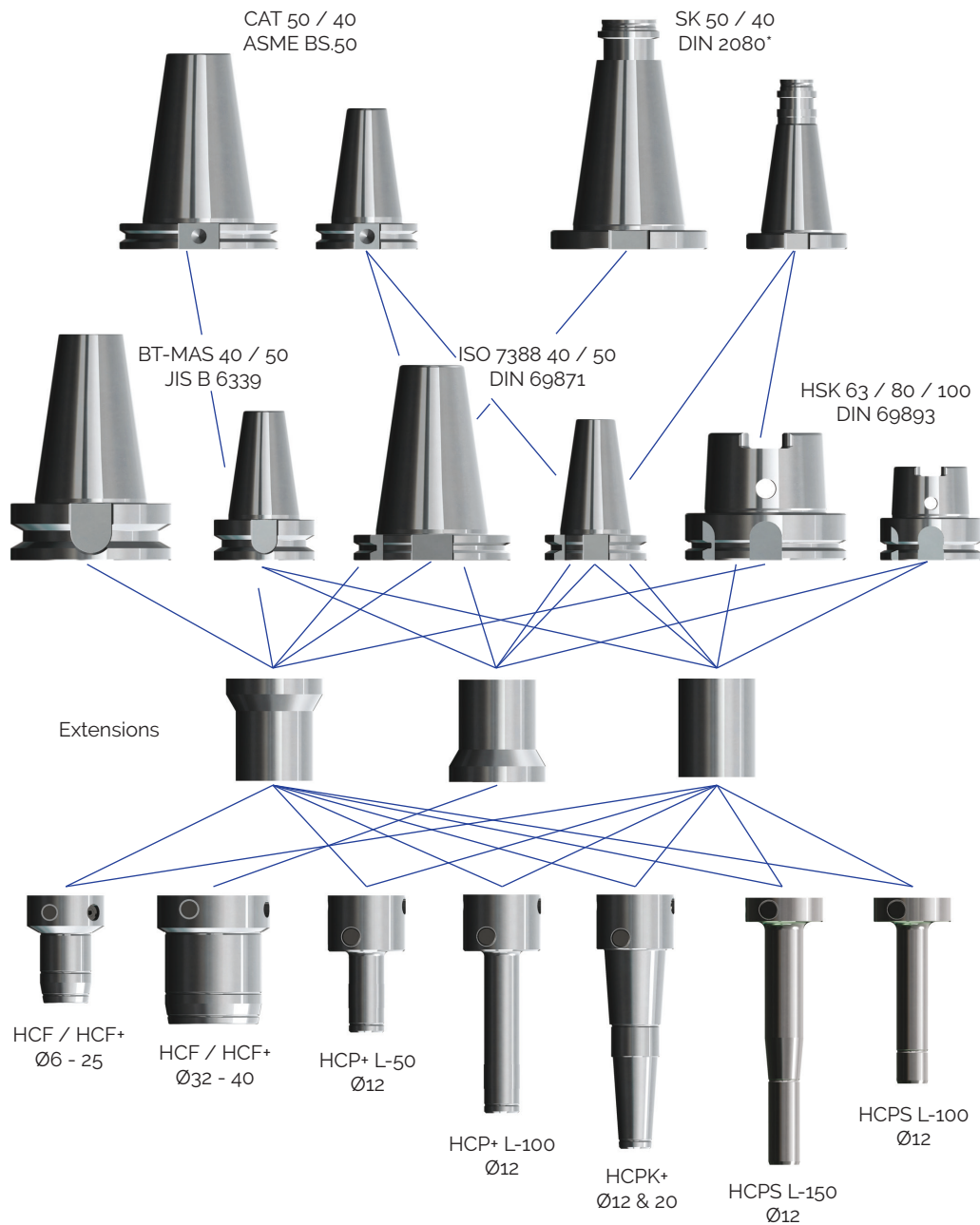


▲ **HCK+**
Extra short and powerful chuck



▲ **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.

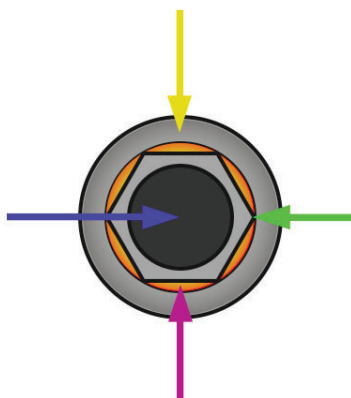
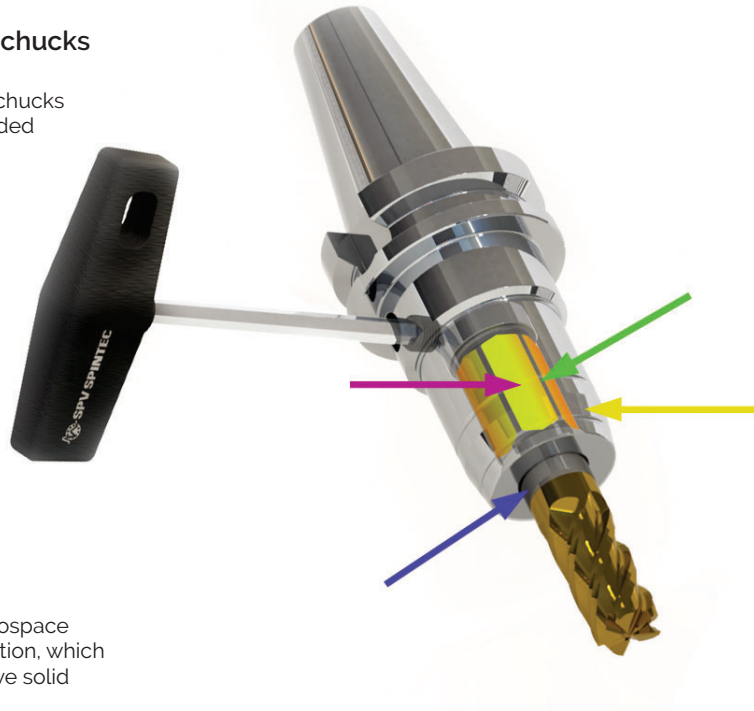
Customers have often been obliged to purchase specially shortened hydraulic milling-chucks with increased torque when they have needed to remove a large amount of material in the shortest possible time.

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.

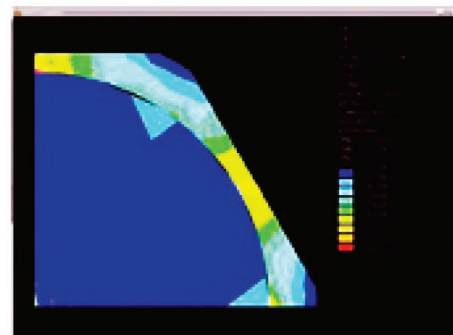
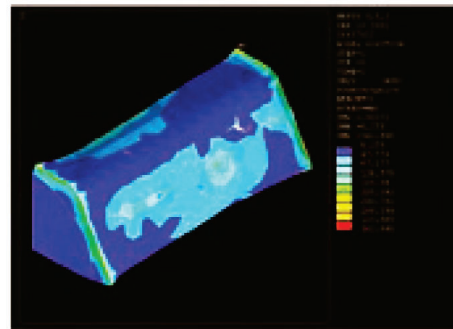
Analysis

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

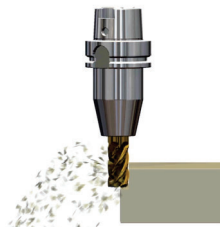
- Hydrochucks HCF+ with tools Ø10, Ø12 and Ø20 can manage the cutting data in Jabro's recommendation for coarse slab milling.
- 2 x the recommended axial cutting depth is quite OK, without any vibrations arising that could damage the cutting tool.
- 2 x the recommended radial cutting depth is quite OK.

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.

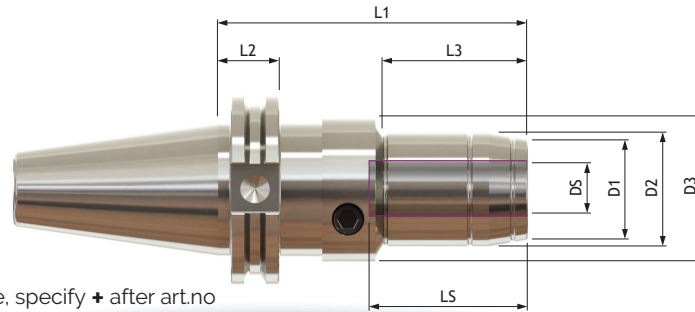
Results in a chip area of:
 $1 \times D \text{ mm} \times 0,4 \times D \text{ mm} = 0,4 \times D \text{ mm}^2$



HYDROCHUCKS

CAT / ASME BS.50

HCF / HCF+



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

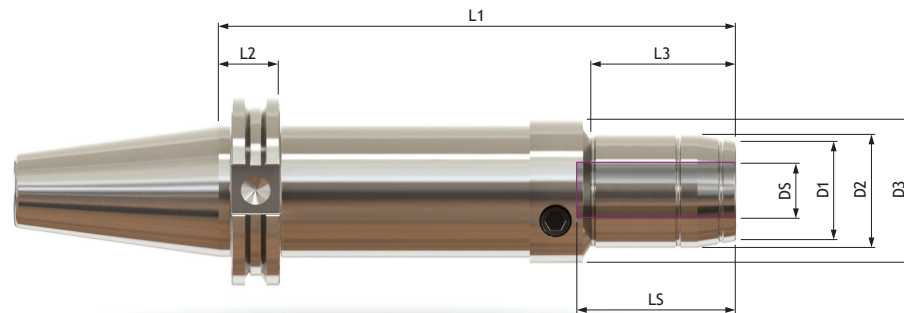
D5 Ømm	Mount type.	D1 Ømm	D2 Ømm	D3 Ømm	L1 mm	L2 mm	L3 mm	L5 mm	Art.no
6	CAT 40	21,5	26	48	105	19,05	43,5	37,5	56470
	CAT 50	21,5	26	48	87	19,05	43,5	37,5	56490
	CAT 50	21,5	26	48	101,6	19,05	43,5	37,5	56480
8	CAT 40	23,5	28	48	105	19,05	43,5	37,5	56471
	CAT 50	23,5	28	48	84	19,05	43,5	37,5	56491
	CAT 50	23,5	28	48	101,6	19,05	43,5	37,5	56481
10	CAT 40	25,5	30	48	105	19,05	43,5	42,5	56472
	CAT 50	25,5	30	48	84	19,05	43,5	42,5	56492
	CAT 50	25,5	30	48	101,6	19,05	43,5	42,5	56482
12 ▲	CAT 40	27,5	32	48	105	19,05	43,5	47,5	56473
	CAT 50	27,5	32	48	84	19,05	43,5	47,5	56493
	CAT 50	27,5	32	48	101,6	19,05	43,5	47,5	56483
14	CAT 40	29,5	34	48	105	19,05	44,5	47,5	56474
	CAT 50	29,5	34	48	84	19,05	44,5	47,5	56494
	CAT 50	29,5	34	48	101,6	19,05	44,5	47,5	56484
16	CAT 40	33,5	38	48	105	19,05	47,5	52,5	56475
	CAT 50	33,5	38	48	84	19,05	47,5	52,5	56495
	CAT 50	33,5	38	48	101,6	19,05	47,5	52,5	56485
18	CAT 40	35,5	40	48	105	19,05	47,5	52,5	56476
	CAT 50	35,5	40	48	84	19,05	47,5	52,5	56496
	CAT 50	35,5	40	48	101,6	19,05	47,5	52,5	56486
20 ▲	CAT 40	37,5	42	48	105	19,05	47,5	52,5	56477
	CAT 50	37,5	42	48	84	19,05	47,5	52,5	56497
	CAT 50	37,5	42	48	101,6	19,05	47,5	52,5	56487
25	CAT 40	43,5	48	48	109	19,05	89,95	55	56478
	CAT 50	43,5	48	48	91	19,05	82,55	55	56498
	CAT 50	43,5	48	48	105,6	19,05	82,55	55	56488
32 ▲	CAT 40	55,5	60	70	120	19,05	57	65	56479
	CAT 50	55,5	60	70	100	19,05	57	65	56499
	CAT 50	55,5	60	70	114,6	19,05	57	65	56489

▲ = dimension compatible with reduction sleeve.

HYDROCHUCKS

CAT / ASME BS.50

HCFL / HCFL+



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
6	CAT 40	21,5	26	48	127	19,05	43,5	37,5	56600
	CAT 40	21,5	26	48	127 - 480	19,05	43,5	37,5	▲
	CAT 50	21,5	26	48	152,4	19,05	43,5	37,5	56610
	CAT 50	21,5	26	48	127 - 445	19,05	43,5	37,5	▲
8	CAT 40	23,5	28	48	127	19,05	43,5	37,5	56601
	CAT 40	23,5	28	48	124 - 480	19,05	43,5	37,5	▲
	CAT 50	23,5	28	48	152,4	19,05	43,5	37,5	56611
	CAT 50	23,5	28	48	127 - 445	19,05	43,5	37,5	▲
10	CAT 40	25,5	30	48	127	19,05	43,5	42,5	56602
	CAT 40	25,5	30	48	127 - 480	19,05	43,5	42,5	▲
	CAT 50	25,5	30	48	152,4	19,05	43,5	42,5	56612
	CAT 50	25,5	30	48	127 - 445	19,05	43,5	42,5	▲
12 ▲	CAT 40	27,5	32	48	127	19,05	43,5	47,5	56603
	CAT 40	27,5	32	48	127 - 480	19,05	43,5	47,5	▲
	CAT 50	27,5	32	48	152,4	19,05	43,5	47,5	56613
	CAT 50	27,5	32	48	127 - 445	19,05	43,5	47,5	▲
14	CAT 40	29,5	34	48	127	19,05	44,5	47,5	56604
	CAT 40	29,5	34	48	127 - 480	19,05	44,5	47,5	▲
	CAT 50	29,5	34	48	152,4	19,05	44,5	47,5	56614
	CAT 50	29,5	34	48	127 - 445	19,05	44,5	47,5	▲
16	CAT 40	33,5	38	48	127	19,05	47,5	52,5	56605
	CAT 40	33,5	38	48	127 - 480	19,05	47,5	52,5	▲
	CAT 50	33,5	38	48	152,4	19,05	47,5	52,5	56615
	CAT 50	33,5	38	48	127 - 445	19,05	47,5	52,5	▲

▲ = dimension compatible with reduction sleeve.

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

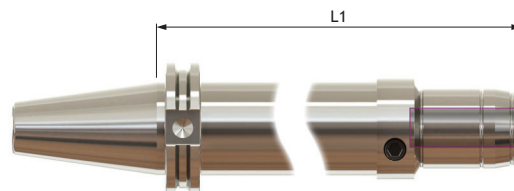
For chuck with Plus-membrane, specify + after art.no

DS Ø mm	Mount type.	D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	L5 mm	Art.no
18	CAT 40	35,5	40	48	127	19,05	47,5	52,5	56606
	CAT 40	35,5	40	48	127 - 480	19,05	47,5	52,5	▲
	CAT 50	35,5	40	48	152,4	19,05	47,5	52,5	56616
20 ▲	CAT 50	35,5	40	48	127 - 445	19,05	47,5	52,5	▲
	CAT 40	37,5	42	48	127	19,05	47,5	52,5	56607
	CAT 40	37,5	42	48	127 - 480	19,05	47,5	52,5	▲
	CAT 50	37,5	42	48	152,4	19,05	47,5	52,5	56617
	CAT 50	37,5	42	48	127 - 445	19,05	47,5	52,5	▲
25	CAT 40	43,5	48	48	131	19,05	111,95	55	56608
	CAT 40	43,5	48	48	131 - 480	19,05	-----	55	▲
	CAT 50	43,5	48	48	152,4	19,05	132,4	55	56618
	CAT 50	43,5	48	48	131 - 445	19,05	-----	55	▲
32 ▲	CAT 40	55,5	60	70	158	19,05	57	65	56609
	CAT 40	55,5	60	70	158 - 480	19,05	-----	65	▲
	CAT 50	55,5	60	70	154,6	19,05	57	65	56619
	CAT 50	55,5	60	70	140 - 445	19,05	-----	65	▲

▲ = dimension compatible with reduction sleeve.

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

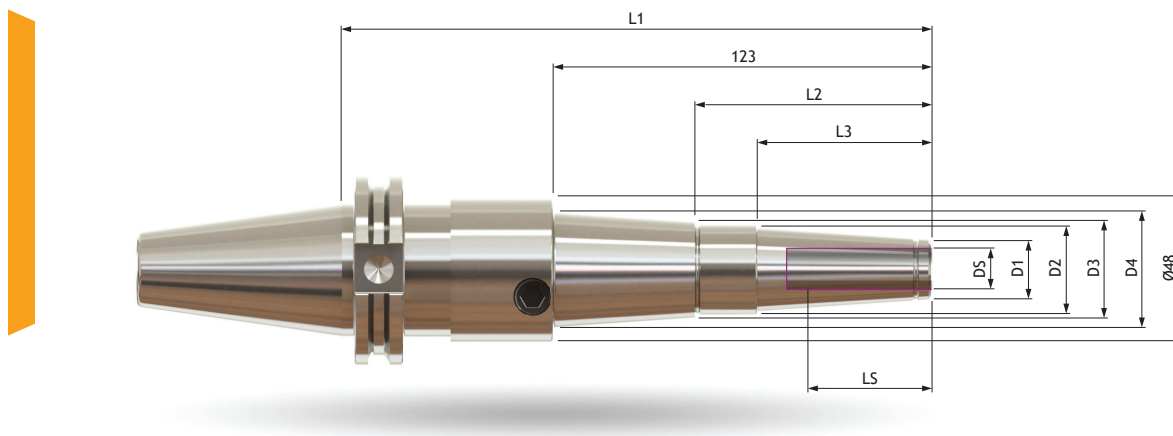
Choose your own length (L1) of HCFL / HCFL+. Specify Art.no / L1 on order.



HYDROCHUCKS

CAT / ASME BS.50

HCPK+

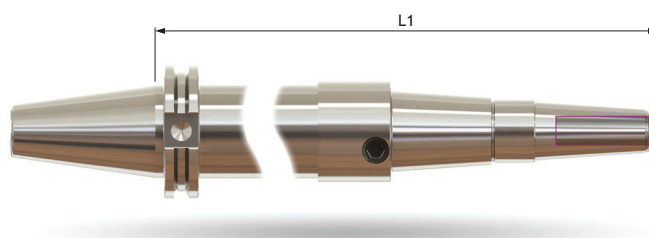


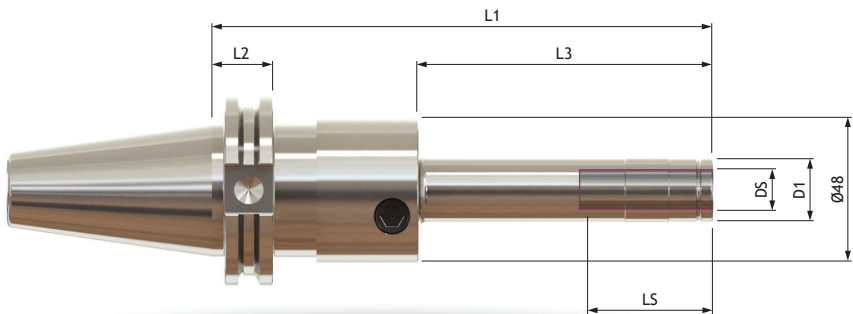
DS Ømm	Mount type.	D1 Ømm	D2 Ømm	D3 Ømm	D4 Ømm	L1 mm	L2 mm	L3 mm	L5 mm	Art.no
12	CAT 40	20	30	32	40,5	195	76,8	57	47,5	59263+
	CAT 40	20	30	32	40,5	235 - 480	76,8	57	47,5	
	CAT 50	20	30	32	40,5	177	76,8	57	47,5	59273+
	CAT 50	20	30	32	40,5	217 - 445	76,8	57	47,5	
20	CAT 40	32	39	42	50,5	195	74,8	55	52,5	59267+
	CAT 40	32	39	42	50,5	235 - 480	74,8	55	52,5	
	CAT 50	32	39	42	50,5	177	74,8	55	52,5	59277+
	CAT 50	32	39	42	50,5	217 - 445	74,8	55	52,5	

= 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.





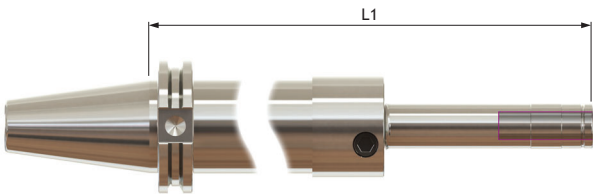
Short model



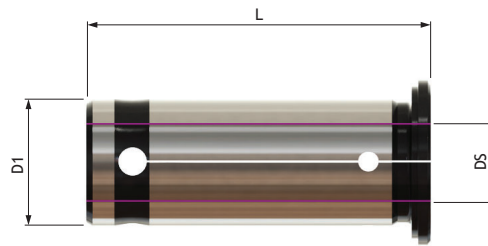
D5 Ømm	Mount type.	D1 Ømm	L1 mm	L2 mm	L3 mm	L5 mm	Art.no
12 	CAT 40	22,5	123	19,05	50	47,5	59033+
	CAT 40	22,5	173	19,05	100	47,5	59043+
	CAT 50	22,5	105	19,05	50	47,5	59083+
	CAT 50	22,5	155	19,05	100	47,5	59093+

 = dimension compatible with reduction sleeve.

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



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	D5 Ømm	L mm	Art.no
12	3	44	90003
	4	44	90004
	5	44	90005
	6	44	90006
	8	44	90008
	10	44	90010
20	3	50	90103
	4	50	90104
	5	50	90105
	6	50	90106
	8	50	90108
	10	50	90110
	12	50	90112
	14	50	90114
32	16	50	90116
	6	63	90206
	8	63	90208
	10	63	90210
	12	63	90212
	14	63	90214
	16	63	90216
	18	63	90218
	20	63	90220
	25	63	90225

Reduction sleeves D = inch

D1 Ømm	D5 Ømm	L mm	Art.no
3/4"	1/8"		67960
	5/32"		67961
	3/16"		67962
	1/4"		67963
	5/16"		67964
	3/8"		67965
	7/16"		67966
	1/2"		67967
1 1/4"	9/16"		67968
	5/8"		67969
	3/8"		67980
	1/2"		67981
	5/8"		67982
	3/4"		67983
	1"		67984

Custom sleeves

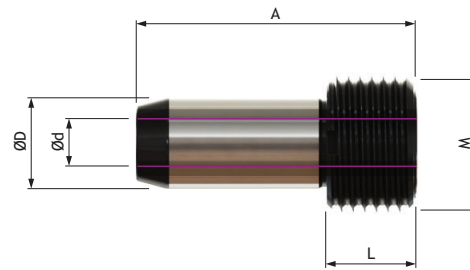
We also provide sleeves with custom clamping diameter (DS).

Please contact us for more info.

HYDROCHUCKS

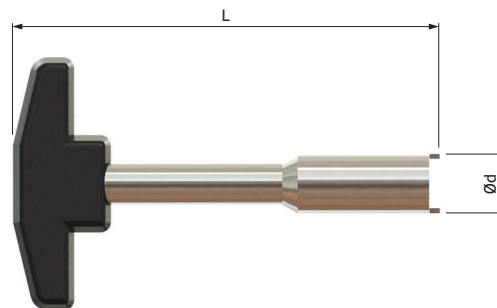
Accessories

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

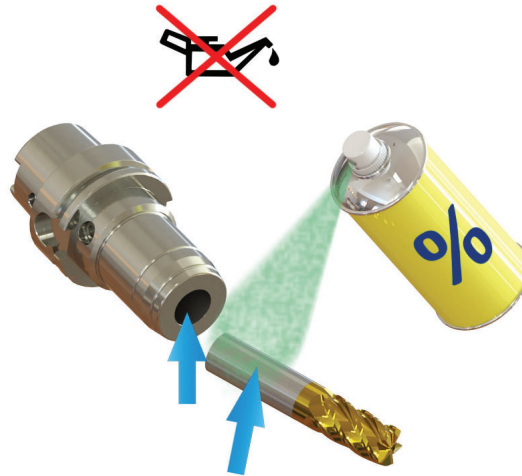
Operating instructions

- **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.

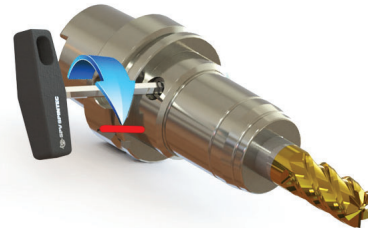
- **2. Cleaning**

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.

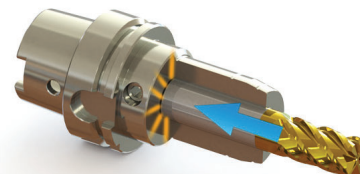


- **4. Tool insertion length**

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.