

**WTO**

# CoolSpeed<sup>®</sup> Flex

Ultra-high rotation speed up to 80,000 rpm  
Affordable and flexible in use!



Ideal for Swiss Type lathes and turning centers  
Best dynamic runout  
Extended tool life

# CoolSpeed<sup>®</sup> Flex

Ultra-high rotation speed up to 80,000 rpm.

Adjustable number of jets.

Applications: Milling, Drilling, Grinding, Deburring, Engraving.

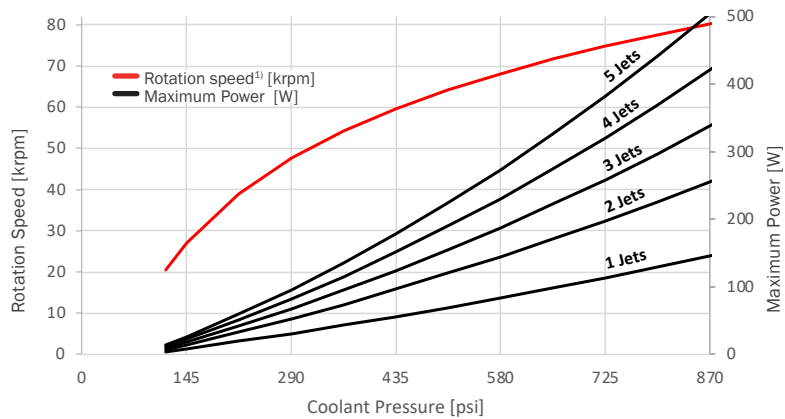


Driven by	Coolant or Cutting Oil
Rotation Speed	30.000-80.000 rpm
Number of Jets	1-5
Operating Pressure	145-870 psi (10-60 bar)
Flow Rate	2.0-7.5 gal/min (8-28 l/min)
Maximum Power	150-500 W
Tool Shank Ø	3 mm, 4 mm, 6 mm



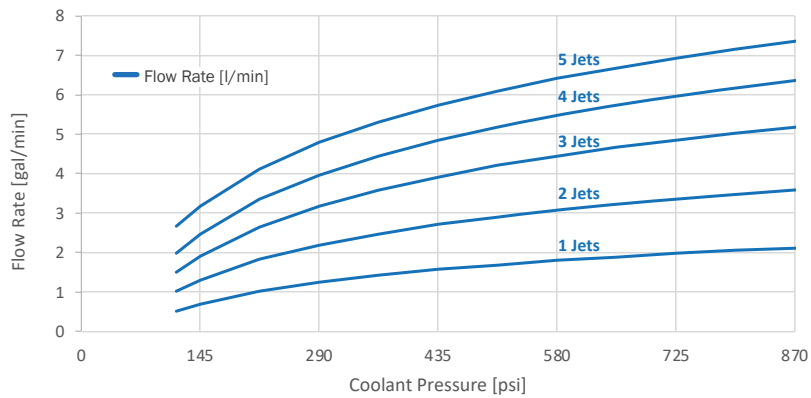
CoolSpeed® Flex is a new state-of-the-art turbine-driven ultra-high-speed spindle. Due to the adjustable number of jets, CoolSpeed® Flex can also be operated by coolant pumps with a flow rate as low as 2.1 gal/min.

### Rotation Speed & Maximum Power/Coolant Pressure

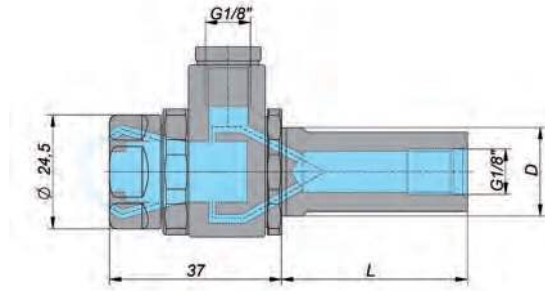


<sup>1)</sup> Idle speed. The operation speed is approx. 10% lower depending on the load.

### Flow Rate/Coolant Pressure



## CoolSpeed® Flex

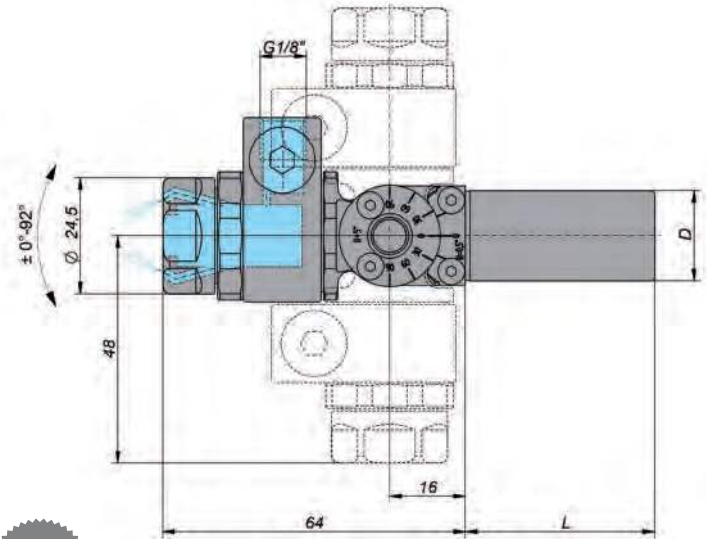


Item No.	D	L
CM-CE-F075-037-FL-A	¾" (19.05)	40
CM-CE-F020-037-FL-A	20	50
CM-CE-F022-037-FL-A	22	50
CM-CE-F025-037-FL-A	25	55

Dimensions in mm



## CoolSpeed® Flex V

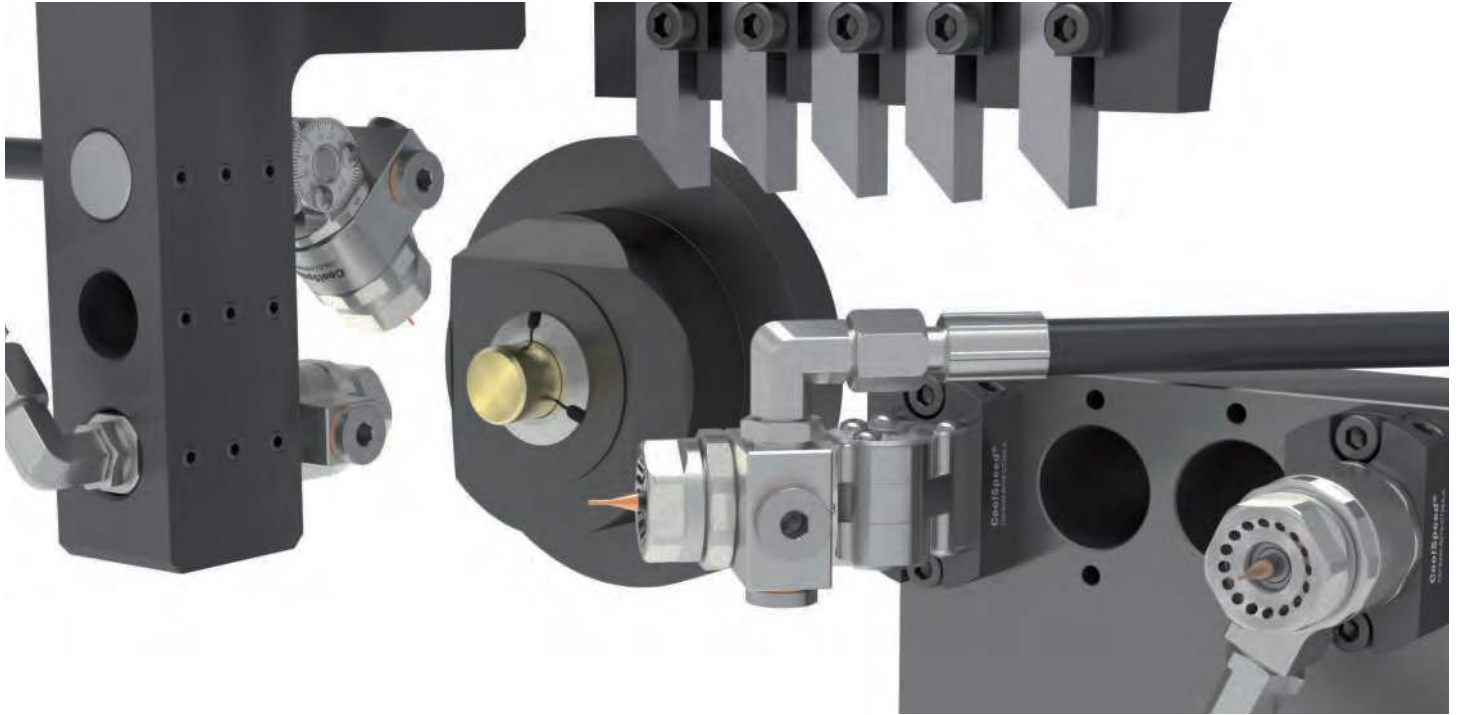


Item No.	D	L
CM-CV-R075-016-FL-A	¾" (19.05)	40
CM-CV-R020-016-FL-A	20	50
CM-CV-R022-016-FL-A	22	50
CM-CV-R025-016-FL-A	25	55

Dimensions in mm



## Application for Citizen



### CoolSpeed® Flex

CM-CE-F075-037-FL-A

Shaft Ø 19.05 mm (¾")



### CoolSpeed® Flex V

CM-CV-R075-016-FL-A

Shaft Ø 19.05 mm (¾")



### Machine Adapter

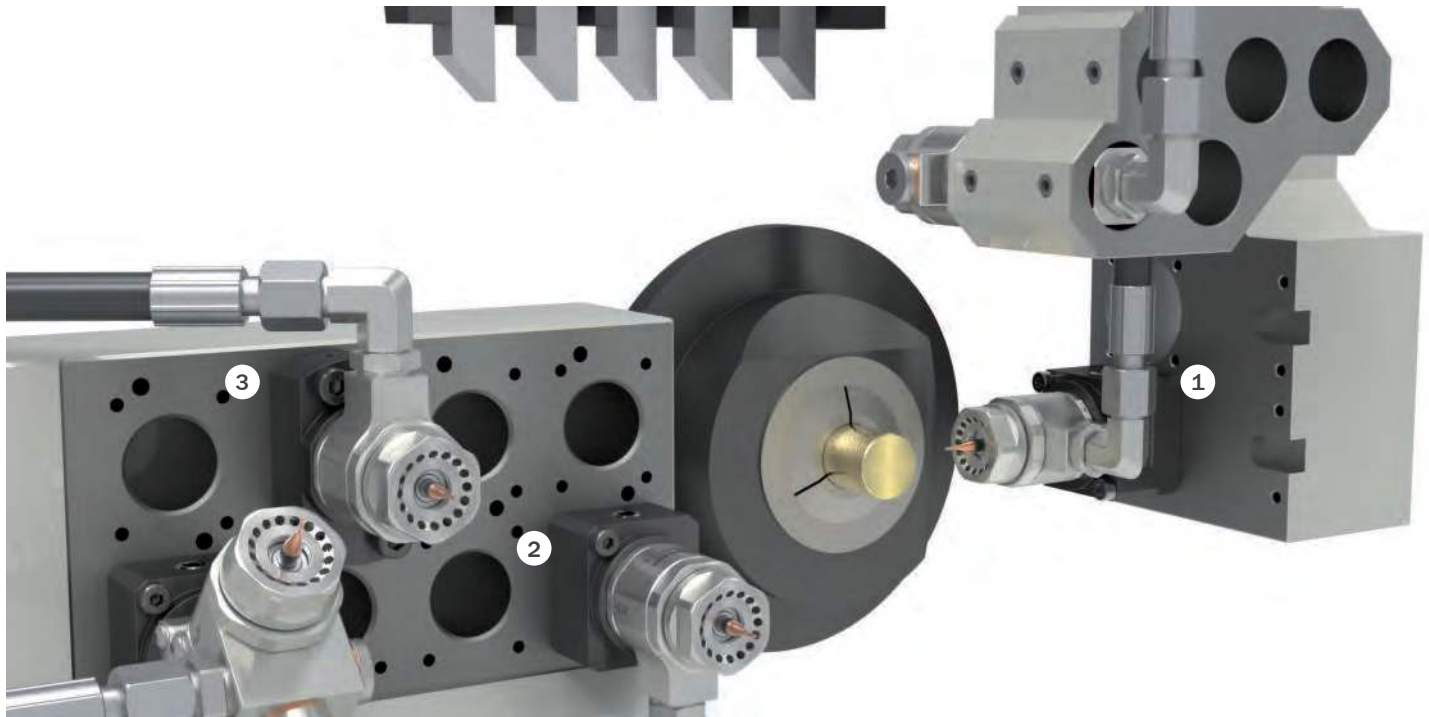
CM-MA-CT25A-R075-A

Shaft Ø 25 mm

Bore Ø 19.05 mm (¾")



## Application for Star



**CoolSpeed® Flex**  
CM-CE-F022-037-FL-A

Shaft Ø 22 mm



**CoolSpeed® Flex V**  
CM-CV-R022-016-FL-A

Shaft Ø 22 mm



**Machine Adapter**  
CM-MA-ST34A-R022-A

Shaft Ø 34 mm  
Bore Ø 22 mm



**Machine Adapter**  
CM-MA-ST22B-R022-A

Bore Ø22 mm

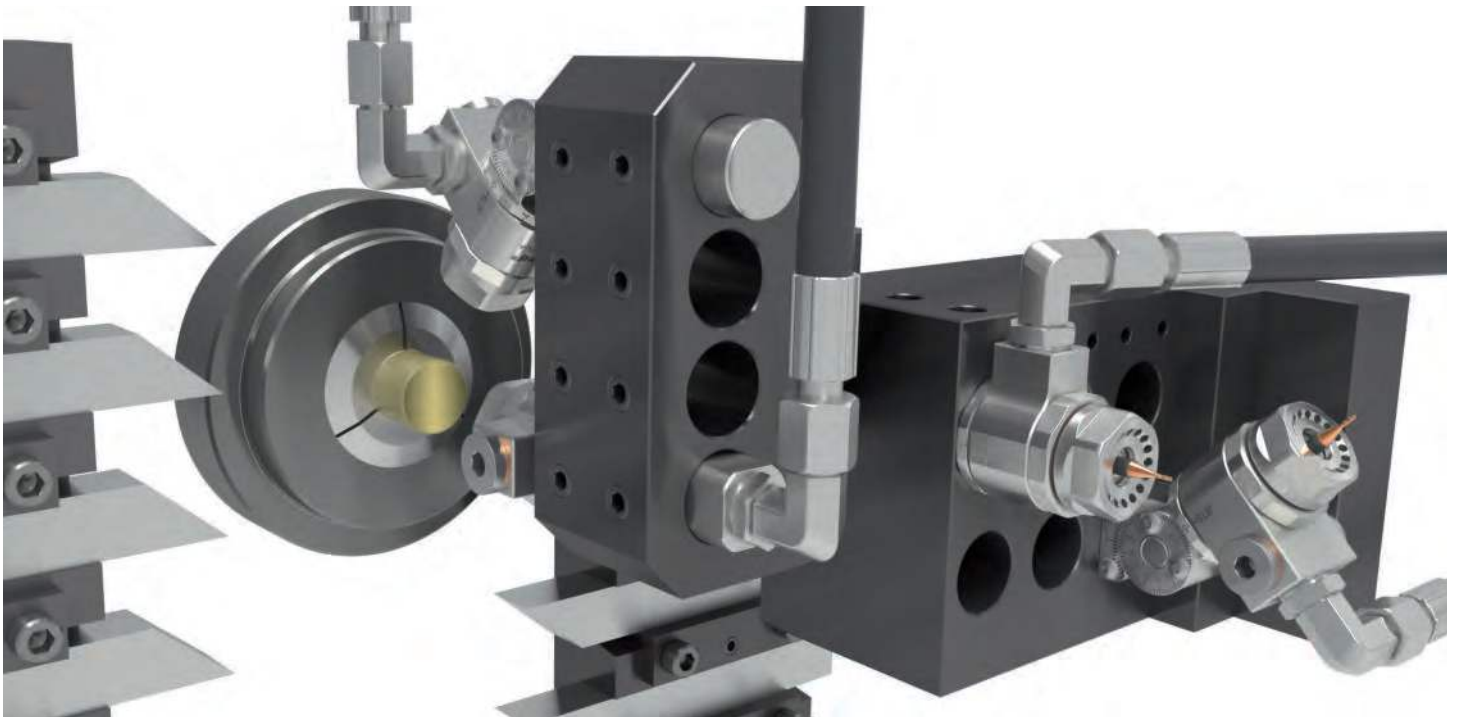


**Machine Adapter**  
CM-MA-ST22A-R022-A

Bore Ø 22 mm



## Application for Tsugami



### CoolSpeed® Flex

CM-CE-F020-037-FL-A

Shaft Ø 20 mm

### CoolSpeed® Flex

CM-CE-F025-037-FL-A

Shaft Ø 25 mm



### CoolSpeed® Flex V

CM-CV-R020-016-FL-A

Shaft Ø 20 mm

### CoolSpeed® Flex V

CM-CV-R025-016-FL-A

Shaft Ø 25 mm



## Replacement kit

(2 bearings, 1 turbine)

Ø3 mm	CM-SRK-030
Ø4 mm	CM-SRK-040
Ø6 mm	CM-SRK-060



## Bearing Puller

To extract the bearings from the CoolSpeed® housing.

CM-SBW-001



## Assembly Device 3-in-1

Ø3, 4, 6 mm CM-SMD-346



## Master Gauge

For high accurate angular alignment with CoolSpeed® Flex V

CM-SMG-013-A





## Starter Set

Includes:

- CoolSpeed® Flex
- CM-SRK-030 Replacement Kit Ø3 mm
- CM-SRK-040 Replacement Kit Ø4 mm
- CM-SRK-060 Replacement Kit Ø6 mm
- CM-SMD-346 Assembly Device 3-in-1
- CM-SPG-60-SA Bluetooth Pressure Gauge G¼"
- CM-SBW-001 Bearing Puller
- Allen Wrench 5 mm
- Double open-end Wrench 22x27 mm
- Single open-end Wrench 27 mm



Shaft Ø	CoolSpeed® Flex	Starter Set
¾" (19.05 mm)	CM-CE-F075-037-FL-A	CM-CE-F075-037-FL-SK-A
20	CM-CE-F020-037-FL-A	CM-CE-F020-037-FL-SK-A
22	CM-CE-F022-037-FL-A	CM-CE-F022-037-FL-SK-A
25	CM-CE-F025-037-FL-A	CM-CE-F025-037-FL-SK-A

Dimensions in mm

## Pressure Gauge G¼"

CM-SPG-60-C



## Bluetooth Pressure Gauge G $\frac{1}{4}$ "

CM-SPG-60-SA

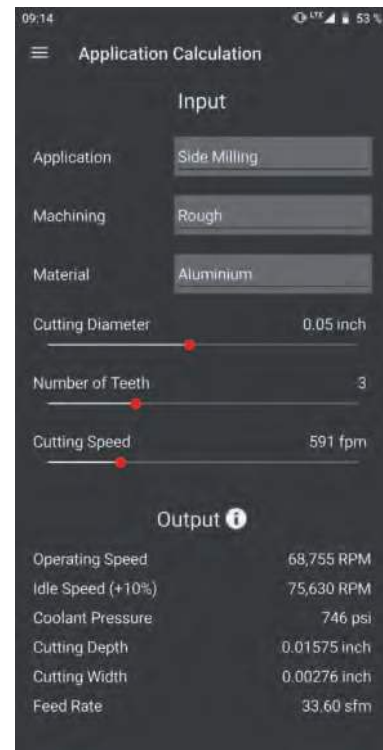
## Replacement Battery

CM-SRB-2450-A



## App „CoolSpeed Pressure Gauge”

The app connects to the Bluetooth Pressure Gauge and displays the rotation speed, coolant pressure, flow rate and power of the high-speed spindle in real time.



## How to Adjust the the Number of Jets

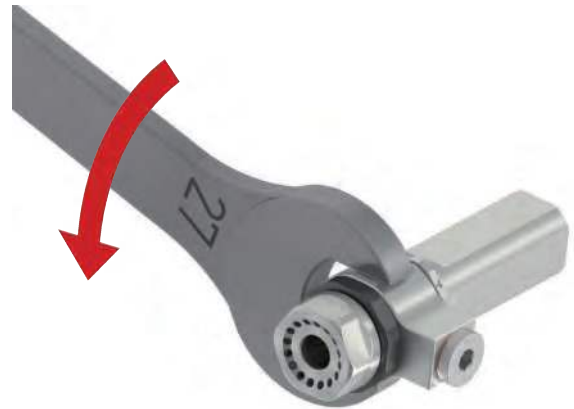
1

Untighten Clamping Nut



2

Adjust the Number of Jets



3

Tighten Clamping Nut



## How to Measure the Coolant Pressure

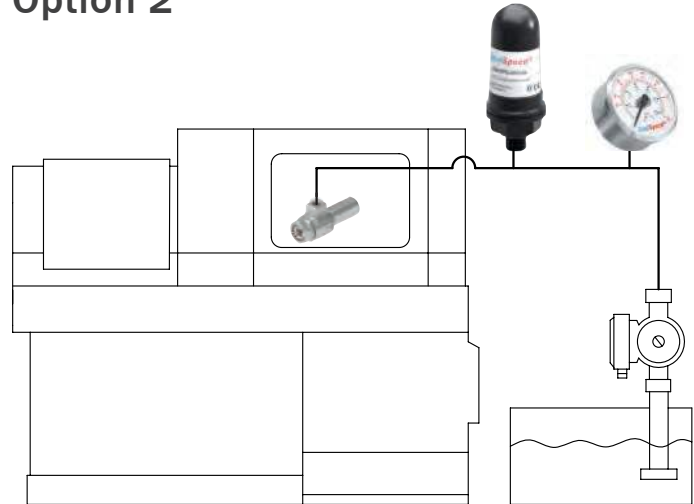
The CoolSpeed® Flex rotation speed depends on the coolant pressure. Therefore, it is important to adjust the coolant pressure as needed for the application. There are two options to measure the coolant pressure.

### Option 1



Preferred option, as the measurement of the pressure is close to CoolSpeed® Flex.

### Option 2



Alternative, if there is no possibility to place the manometer inside the operation area. With this option, the speed determination is less accurate than option 1.

## Adjust the Rotation Speed

1. Adjust CoolSpeed® Flex to 5 Jets
2. Switch the coolant pressure on
3. Read the pressure and rotation speed from the Pressure Gauge or using the CoolSpeed® App
4. Adjust the coolant pressure via the pump control until the desired rotation speed is reached
5. If the desired speed cannot be reached: Switch the coolant pressure off, reduce the number of jets and repeat from point 2

Note: The inner diameter of the coolant supply pipe should be at least 4 mm.

The rotation speed refers to the idle speed.

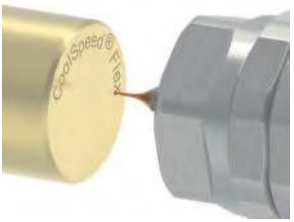
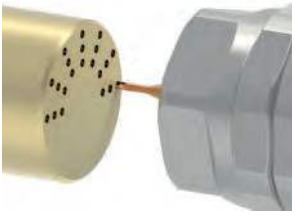
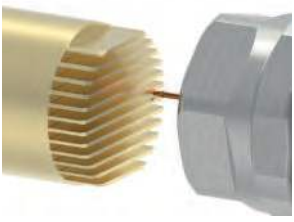
The operation speed is approx. 10% lower depending on the load on CoolSpeed®.

## Assembly of Bearings and Turbine onto the Cutting Tool

Note: The tolerance of the tool shank should be h6 or better.



## Application Examples

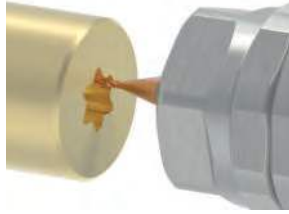
					Tool-Ø	0.0787	0.0394	0.0197
					Cutting Values	Finish Machining	Finish Machining	Finish Machining
Material	Coolant Pressure [psi]	Idle Speed [rpm]	Operation Speed [rpm]					
<b>Engraving</b> 	Stainless Steel	290	48,000	43,000	$a_p$	0.0063	0.0031	0.0016
					$v_f$	31.5	63.0	126.0
					$a_p$	0.0063	0.0031	0.0016
		580	68,000	61,000	$v_f$	39.4	78.7	157.5
					$a_p$	0.0063	0.0031	0.0016
					$v_f$	47.2	94.5	189.0
	Aluminum	290	48,000	43,000	$a_p$	0.0105	0.0052	0.0026
					$v_f$	52.5	105.0	210.0
					$a_p$	0.0105	0.0052	0.0026
	580	68,000	61,000	$v_f$	65.6	131.2	262.5	
				$a_p$	0.0105	0.0052	0.0026	
				$v_f$	78.7	157.5	315.0	
Carbon Steel	290	48,000	43,000	$a_p$	0.0072	0.0036	0.0018	
				$v_f$	40.9	81.9	163.8	
				$a_p$	0.0072	0.0036	0.0018	
	580	68,000	61,000	$v_f$	51.2	102.4	204.7	
				$a_p$	0.0072	0.0036	0.0018	
				$v_f$	61.4	122.8	245.7	
<b>Drilling</b> 	Stainless Steel	290	48,000	43,000	$a_p$	0.0236	0.0118	0.0059
					$v_f$	39.4	59.1	88.6
					$a_p$	0.0236	0.0118	0.0059
		580	68,000	61,000	$v_f$	49.2	73.8	110.7
					$a_p$	0.0236	0.0118	0.0059
					$v_f$	59.1	88.6	132.9
	Aluminum	290	48,000	43,000	$a_p$	0.0236	0.0118	0.0059
					$v_f$	39.4	59.1	88.6
					$a_p$	0.0236	0.0118	0.0059
	580	68,000	61,000	$v_f$	49.2	73.8	110.7	
				$a_p$	0.0236	0.0118	0.0059	
				$v_f$	59.1	88.6	132.9	
Carbon Steel	290	48,000	43,000	$a_p$	0.0236	0.0118	0.0059	
				$v_f$	39.4	59.1	88.6	
				$a_p$	0.0236	0.0118	0.0059	
	580	68,000	61,000	$v_f$	49.2	73.8	110.7	
				$a_p$	0.0236	0.0118	0.0059	
				$v_f$	59.1	88.6	132.9	
<b>Slot Milling</b> 	Stainless Steel	290	48,000	43,000	$a_p$	0.0039	0.0020	0.0010
					$v_f$	15.7	31.5	63.0
					$a_p$	0.0039	0.0020	0.0010
		580	68,000	61,000	$v_f$	19.7	39.4	78.7
					$a_p$	0.0039	0.0020	0.0010
					$v_f$	23.6	47.2	94.5
	Aluminum	290	48,000	43,000	$a_p$	0.0066	0.0033	0.0016
					$v_f$	26.2	52.5	105.0
					$a_p$	0.0066	0.0033	0.0016
	580	68,000	61,000	$v_f$	32.8	65.6	131.2	
				$a_p$	0.0066	0.0033	0.0016	
				$v_f$	39.4	78.7	157.5	
Carbon Steel	290	48,000	43,000	$a_p$	0.0045	0.0022	0.0011	
				$v_f$	20.5	40.9	81.9	
				$a_p$	0.0045	0.0022	0.0011	
	580	68,000	61,000	$v_f$	20.5	51.2	102.4	
				$a_p$	0.0045	0.0022	0.0011	
				$v_f$	30.7	61.4	122.8	

$a_p$  in inch,  $v_f$  in sfm.

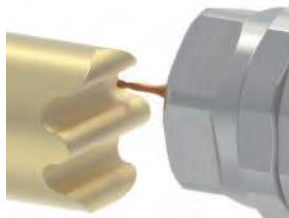
The cutting values apply to CoolSpeed® Flex using 4 jets. The values are for orientation only and shall be adapted to the specific application by gradually increasing  $v_f$  until the optimum cutting result is achieved.

## Application Examples

### Side Milling



### Profile Milling



Material	Coolant Pressure [psi]	Idle Speed [rpm]	Operation Speed [rpm]	Tool-Ø	0.0787		0.0394		0.0197	
					Cutting Values	Rough Machining	Finish Machining	Rough Machining	Finish Machining	Rough Machining
Stainless Steel	290	48,000	43,000	$a_p$	0.0157	0.0157	0.0079	0.0079	0.0039	0.0039
				$a_e$	0.0019	0.0009	0.0014	0.0007	0.0009	0.0005
				$v_f$	78.7	39.4	118.1	59.1	177.2	88.6
	580	68,000	61,000	$a_p$	0.0157	0.0157	0.0079	0.0079	0.0039	0.0039
				$a_e$	0.0019	0.0009	0.0014	0.0007	0.0009	0.0005
				$v_f$	98.4	49.2	147.6	73.8	221.5	110.7
	870	80,000	72,000	$a_p$	0.0157	0.0157	0.0079	0.0079	0.0039	0.0039
				$a_e$	0.0019	0.0009	0.0014	0.0007	0.0009	0.0005
				$v_f$	118.1	59.1	177.2	88.6	265.7	132.9
Aluminum	290	48,000	43,000	$a_p$	0.0262	0.0262	0.0131	0.0131	0.0066	0.0066
				$a_e$	0.0031	0.0016	0.0024	0.0012	0.0016	0.0008
				$v_f$	131.2	65.6	196.9	98.4	295.3	147.6
	580	68,000	61,000	$a_p$	0.0262	0.0262	0.0131	0.0131	0.0066	0.0066
				$a_e$	0.0031	0.0016	0.0024	0.0012	0.0016	0.0008
				$v_f$	164.0	82.0	246.1	123.0	369.1	184.5
	870	80,000	72,000	$a_p$	0.0262	0.0262	0.0131	0.0131	0.0066	0.0066
				$a_e$	0.0031	0.0016	0.0024	0.0012	0.0016	0.0008
				$v_f$	196.9	98.4	295.3	147.6	492.1	221.5
Carbon Steel	290	48,000	43,000	$a_p$	0.0180	0.0180	0.0090	0.0090	0.0045	0.0045
				$a_e$	0.0032	0.0016	0.0024	0.0012	0.0016	0.0008
				$v_f$	102.4	51.2	153.5	76.8	230.3	115.2
	580	68,000	61,000	$a_p$	0.0180	0.0180	0.0090	0.0090	0.0045	0.0045
				$a_e$	0.0032	0.0016	0.0024	0.0012	0.0016	0.0008
				$v_f$	128.0	64.0	191.9	96.0	287.9	143.9
	870	80,000	72,000	$a_p$	0.0180	0.0180	0.0090	0.0090	0.0045	0.0045
				$a_e$	0.0032	0.0016	0.0024	0.0012	0.0016	0.0008
				$v_f$	153.5	76.8	230.3	115.2	345.5	172.7
Stainless Steel	290	48,000	43,000	$a_p$	0.0079	0.0039	0.0039	0.0020	0.0020	0.0010
				$a_e$	0.0013	0.0006	0.0006	0.0003	0.0003	0.0004
				$v_f$	39.4	19.7	78.7	39.4	157.5	78.7
	580	68,000	61,000	$a_p$	0.0079	0.0039	0.0039	0.0020	0.0020	0.0010
				$a_e$	0.0013	0.0006	0.0006	0.0003	0.0003	0.0004
				$v_f$	49.2	24.6	98.4	49.2	196.9	98.4
	870	80,000	72,000	$a_p$	0.0079	0.0039	0.0039	0.0020	0.0020	0.0010
				$a_e$	0.0013	0.0006	0.0006	0.0003	0.0003	0.0004
				$v_f$	59.1	29.5	118.1	59.1	236.2	118.1
Aluminum	290	48,000	43,000	$a_p$	0.0131	0.0066	0.0066	0.0033	0.0033	0.0016
				$a_e$	0.0021	0.0010	0.0010	0.0005	0.0005	0.0003
				$v_f$	65.6	32.8	131.2	65.6	262.5	131.2
	580	68,000	61,000	$a_p$	0.0131	0.0066	0.0066	0.0033	0.0033	0.0016
				$a_e$	0.0021	0.0010	0.0010	0.0005	0.0005	0.0003
				$v_f$	82.0	41.0	164.0	82.0	328.1	164.0
	870	80,000	72,000	$a_p$	0.0131	0.0066	0.0066	0.0033	0.0033	0.0016
				$a_e$	0.0021	0.0010	0.0010	0.0005	0.0005	0.0003
				$v_f$	98.4	49.2	196.9	98.4	393.7	196.9
Carbon Steel	290	48,000	43,000	$a_p$	0.0090	0.0045	0.0045	0.0022	0.0022	0.0011
				$a_e$	0.0021	0.0011	0.0011	0.0005	0.0005	0.0003
				$v_f$	51.2	25.6	102.4	51.2	204.7	102.4
	580	68,000	61,000	$a_p$	0.0090	0.0045	0.0045	0.0022	0.0022	0.0011
				$a_e$	0.0021	0.0011	0.0011	0.0005	0.0005	0.0003
				$v_f$	64.0	32.0	128.0	64.0	255.9	128.0
	870	80,000	72,000	$a_p$	0.0090	0.0045	0.0045	0.0022	0.0022	0.0011
				$a_e$	0.0021	0.0011	0.0011	0.0005	0.0005	0.0003
				$v_f$	76.8	38.4	153.5	76.8	307.1	153.5

$a_p$  and  $a_e$  in inch,  $v_f$  in sfm.

The values apply to CoolSpeed® Flex using 4 jets. The values are for orientation only and shall be adapted to the specific application by gradually increasing  $v_f$  until the optimum cutting result is achieved.