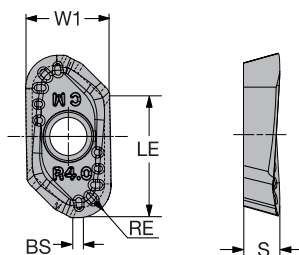


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# Ordering information

RAL90

## RAL90 insert for milling



				N Dimensions, mm, inch					
				H13A	W1	LE	S	BS	
Medium		15	0.50	KPHT 15 04 05 FR-CM H13A	☆	10.7	14.0	4.60	0.9
			0.020			.420	.590	.180	.035
		0.80		KPHT 15 04 08 FR-CM H13A	☆	10.7	14.0	4.60	0.9
			0.031			.420	.590	.180	.035
		1.60		KPHT 15 04 16 FR-CM H13A	☆	10.7	14.0	4.60	1.4
			0.063			.420	.590	.180	.055
		2.00		KPHT 15 04 20 FR-CM H13A	☆	10.7	14.0	4.60	0.9
			0.079			.420	.590	.180	.035
		2.50		KPHT 15 04 25 FR-CM H13A	☆	10.7	14.0	4.60	1.2
			0.098			.420	.590	.180	.047
		3.10		KPHT 15 04 31 FR-CM H13A	☆	10.7	14.0	4.60	0.9
			0.122			.420	.590	.180	.035
4.00		KPHT 15 04 40 FR-CM H13A	☆	10.7	14.0	4.60	0.9		
	0.157			.420	.590	.180	.035		
5.00		KPHT 15 04 50 FR-CM H13A	☆	10.7	14.0	4.60	0.9		
	0.197			.420	.590	.180	.035		

## Feed recommendations

Geometry	ISO N		
	Feed per tooth, $f_z$ mm (inch)		
	min.	rec.	max.
KPHT 15 04	0.10 (.0039)	0.20 (.0078)	0.30 (.0118)

## Example of cutting parameters:

DC: 40 mm; Z=4  
 n: 23720 RPM  
 ap: 6 mm (0.236 inch)  
 ae: 40 mm (1.57 inch)  
 fz: 0.2 mm/tooth (0.008 in/tooth)  
 vf: 18976 mm/min (747 in/min)  
 MRR: 4554 cm<sup>3</sup>/min (278 in<sup>3</sup>/min)

# RAL90 square shoulder milling cutter

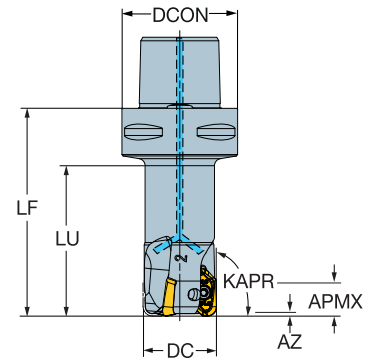
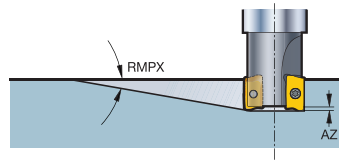
Internal coolant supply

Coromant Capto®



KAPR

90°



## Inch version

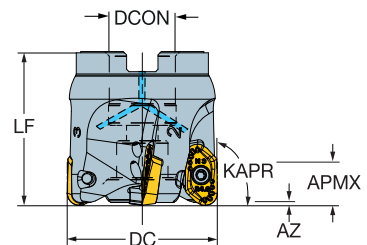
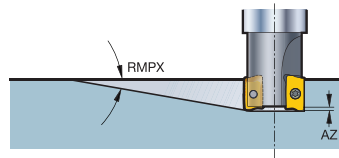
								Dimensions, inch								
DC		CZC <sub>MS</sub>	APMX	RMPX	AZ	CNSC		Ordering code	DCON	DCX	LF	LU		RPMX	CICT	MIID <sub>E</sub>
1.000	15	C5	.550	15°	.130	1	2	RAL90A-025C5-16L	1.969	1.000	2.900	2.000	1.32	35000	2	KPHT 15 04..
1.250	15	C5	.550	12°	.130	1	3	RAL90A-032C5-16M	1.969	1.250	3.400	2.500	1.65	31000	3	KPHT 15 04..
2.000	15	C5	.550	7°	.130	1	4	RAL90A-050C5-16H	1.969	2.000	3.800	2.900	2.87	23500	4	KPHT 15 04..

## Arbor



KAPR

90°



## Metric version

								Dimensions, mm								
DC		CZC <sub>MS</sub>	APMX	RMPX	AZ	CNSC		Ordering code	DCON	DCX	LF			RPMX	CICT	MIID <sub>E</sub>
50.0	15	22	14.0	7°	3.3	1	4	RAL90-050Q22-16H	22.0	50.0	50.0	5.0	0.4	23500	4	KPHT 15 04..
63.0	15	27	14.0	5°	3.3	1	5	RAL90-063Q27-16H	27.0	63.0	50.0	5.0	0.7	20500	5	KPHT 15 04..

## Inch version

								Dimensions, inch								
DC		CZC <sub>MS</sub>	APMX	RMPX	AZ	CNSC		Ordering code	DCON	DCX	LF			RPMX	CICT	MIID <sub>E</sub>
2.000	15	3/4	.550	7°	.130	1	4	RAL90A-050R19-16H	.750	2.000	1.580	3.68	0.66	23500	4	KPHT 15 04..

RPMX (max. rev/min) for holders must also be considered.

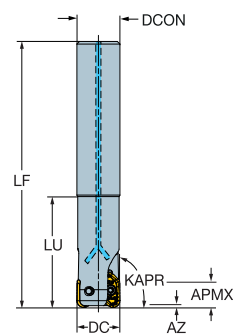
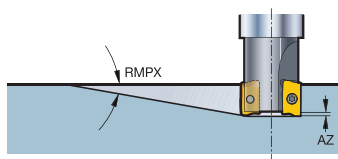
# RAL90 square shoulder milling cutter

Internal coolant supply

Cylindrical shank

KAPR

90°



## Metric version

								Dimensions, mm								
DC		CZC <sub>MS</sub>	APMX	RMPX	AZ	CNSC		Ordering code	DCON	DCX	LF			RPMX	CICT	MIID <sub>E</sub>
25.0	15	25	14.0	15°	3.3	1	2	RAL90-025A25-16L	25.0	25.0	150.0	5.0	0.6	35000	2	KPHT 15 04..

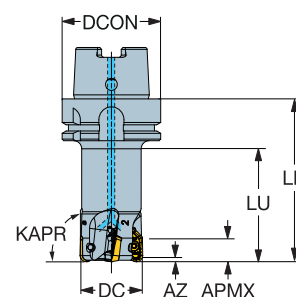
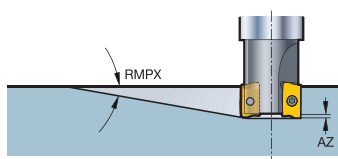
## Inch version

								Dimensions, inch								
DC		CZC <sub>MS</sub>	APMX	RMPX	AZ	CNSC		Ordering code	DCON	DCX	LF			RPMX	CICT	MIID <sub>E</sub>
1.000	15	1	.550	15°	.130	1	2	RAL90A-025O25-16L	1.000	1.000	6.000	3.68	1.32	35000	2	KPHT 15 04..
1.250	15	1 1/4	.550	12°	.130	1	3	RAL90A-032O32-16M	1.250	1.250	6.000	3.68	1.76	31000	3	KPHT 15 04..

## HSK

KAPR

90°



## Metric version

								Dimensions, mm								
DC		CZC <sub>MS</sub>	APMX	RMPX	AZ	CNSC		Ordering code	DCON	DCX	LF	LU		RPMX	CICT	MIID <sub>E</sub>
32.0	15	63	14	12°	3.3	1	3	RAL90-032HA06-16M	63.0	32.0	92.0	61.0	0.9	31000	3	KPHT 15 04..
40.0	15	63	14	10°	3.3	1	4	RAL90-040HA06-16H	63.0	40.0	101.0	70.0	1.3	27500	4	KPHT 15 04..
40.0	15	63	14	10°	3.3	1	4	RAL90-040HA06L-16H	63.0	40.0	156.0	125.0	1.6	27500	4	KPHT 15 04..
50.0	15	63	14	7°	3.3	1	4	RAL90-050HA06-16H	63.0	50.0	111.0	80.0	1.6	23500	4	KPHT 15 04..

RPMX (max. rev/min) for holders must also be considered.

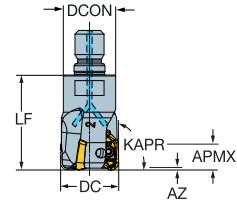
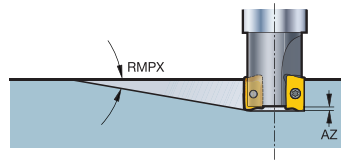
# RAL90 square shoulder milling cutter

Internal coolant supply





Threaded coupling

KAPR

90°

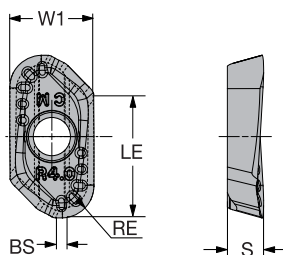


## Metric version

										Dimensions, mm						
DC		CZC <sub>MS</sub>	APMX	RMPX	AZ	CNSC		Ordering code	DCON	DCX	LF			RPMX	CICT	MIID <sub>E</sub>
32.0	15	M16	14.0	12°	3.3	1	3	<b>RAL90-32T16-16M</b>	28.8	32.0	51.0	5.0	0.20	31000	3	KPHT 15 04..
40.0	15	M16	14.0	10°	3.3	1	4	<b>RAL90-40T16-16H</b>	37.0	40.0	51.0	5.0	0.35	27500	4	KPHT 15 04..

RPMX (max. rev/min) for holders must also be considered.

## RAL90 Super MRR insert for milling



				N		Dimensions, mm, inch			
				H13A		W1	LE	S	BS
Medium		15	0.80	KPHX 15 04 08 FR-CM H13A	☆	10.7	14.0	4.60	0.9
			.031			.420	.590	.180	.035
		2.00	0.79	KPHX 15 04 20 FR-CM H13A	☆	10.7	14.0	4.60	0.9
			.079			.420	.590	.180	.035
		3.10	.122	KPHX 15 04 31 FR-CM H13A	☆	10.7	14.0	4.60	0.9
			.122			.420	.590	.180	.035
4.00	.157	KPHX 15 04 40 FR-CM H13A	☆	10.7	14.0	4.60	0.9		
					.420	.590	.180	.035	

## Feed recommendations

Geometry	ISO N		
	Feed per tooth, $f_z$ mm (inch)		
	min.	rec.	max.
KPHX 15 04	0.10 (.0039)	0.20 (.0078)	0.30 (.0118)

## Example of cutting parameters:

DC: 50 mm; Z=4  
 n: 33000 RPM  
 ap: 7 mm (0.276 inch)  
 ae: 40 mm (1.57 inch)  
 fz: 0.19 mm/tooth (0.007 in/tooth)  
 vf: 25000 mm/min (984 in/min)  
 MRR=7000 cm<sup>3</sup>/min (427 in<sup>3</sup>/min)

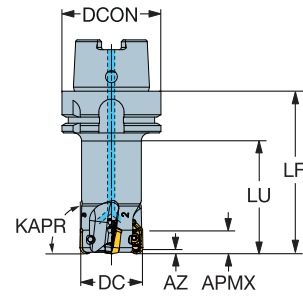
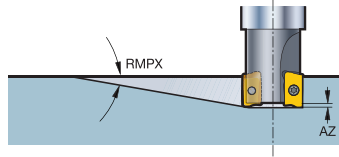
# RAL90 Super MRR square shoulder milling cutter

Internal coolant supply

HSK

KAPR

90°



## Metric version

										Dimensions, mm						
DC		CZC <sub>MS</sub>	APMX	RMPX	AZ	CNSC		Ordering code	DCON	DCX	LF			RPMX	CICT	MIID <sub>E</sub>
50.0	15	63	14.0	7°	3.3	1	4	RAL90-S-050HA06-16H	80.0	50.0	109.0	5.0	1.9	33000	4	KPHX 15 04..
50.0	15	80	14.0	7°	3.3	1	4	RAL90-S-050HFM08-16H	80.0	50.0	100.0	5.0	2.0	33000	4	KPHX 15 04..

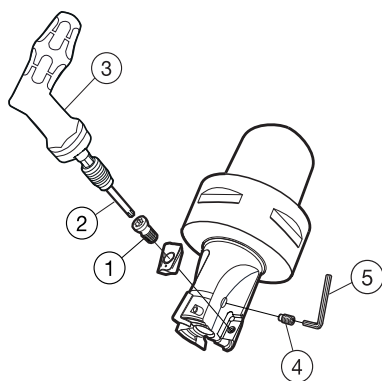
## Inch version

										Dimensions, inch						
DC		CZC <sub>MS</sub>	APMX	RMPX	AZ	CNSC		Ordering code	DCON	DCX	LF			RPMX	CICT	MIID <sub>E</sub>
2.000	15	63	.550	7°	.130	1	4	RAL90A-S-050HA06-16H	3.150	2.000	4.290	3.68	4.19	33000	4	KPHX 15 04..
2.000	15	80	.550	7°	.130	1	4	RAL90A-S-050HFM08-16H	3.150	2.000	3.940	3.68	4.40	33000	4	KPHX 15 04..

HSK-FM for MAKINO's machine models MAG Series A, with two orientation pins for high speed machining of aluminum

RPMX (max. rev/min) for holders must also be considered.

## Spare parts



RAL90

### Metric version

	Spare parts		Accessories		
	1	2	3	4	5
Ordering code	Insert screw	Bit	Torque wrench	Nozzle	Key
RAL90-025A25-16L	5513 020-83	5680 084-02	5680 105-05	5691 026-05	170.3-864
RAL90-32T16-16M	5513 020-83	5680 084-02	5680 105-05	5691 026-05	170.3-864
RAL90-40T16-16H	5513 020-83	5680 084-02	5680 105-05	5691 026-11	174.1-862
RAL90-032HA06-16M	5513 020-83	5680 084-02	5680 105-05	5691 026-05	170.3-864
RAL90-040HA06-16H	5513 020-83	5680 084-02	5680 105-05	5691 026-13	174.1-862
RAL90-040HA06L-16H	5513 020-83	5680 084-02	5680 105-05	5691 026-13	174.1-862
RAL90-050HA06-16H	5513 020-83	5680 084-02	5680 105-05	5691 026-13	174.1-862
RAL90-050Q22-16H	5513 020-83	5680 084-02	5680 105-05	5691 026-13	174.1-862
RAL90-063Q27-16H	5513 020-83	5680 084-02	5680 105-05	5691 026-13	174.1-862

### Inch version

	Spare parts		Accessories		
	1	2	3	4	5
Ordering code	Insert screw	Bit	Torque wrench	Nozzle	Key
RAL90A-025O25-16L	5513 020-83	5680 084-02	5680 105-05	5691 026-05	170.3-864
RAL90A-032O32-16M	5513 020-83	5680 084-02	5680 105-05	5691 026-05	170.3-864
RAL90A-025C5-16L	5513 020-83	5680 084-02	5680 105-05	5691 026-05	170.3-864
RAL90A-032C5-16M	5513 020-83	5680 084-02	5680 105-05	5691 026-05	170.3-864
RAL90A-050C5-16H	5513 020-83	5680 084-02	5680 105-05	5691 026-13	174.1-862
RAL90A-050R19-16H	5513 020-83	5680 084-02	5680 105-05	5691 026-13	174.1-862

RAL90 Super MRR

### Metric version

	Spare parts		Accessories		
	1	2	3	4	5
Ordering code	Insert screw	Bit	Torque wrench	Nozzle	Key
RAL90-S-050HA06-16H	5513 020-83	5680 084-02	5680 105-05	5691 026-13	174.1-862
RAL90-S-050HFM08-16H	5513 020-83	5680 084-02	5680 105-05	5691 026-13	174.1-862

### Inch version

	Spare parts		Accessories		
	1	2	3	4	5
Ordering code	Insert screw	Bit	Torque wrench	Nozzle	Key
RAL90A-S-050HA06-16H	5513 020-83	5680 084-02	5680 105-05	5691 026-13	174.1-862
RAL90A-S-050HFM08-16H	5513 020-83	5680 084-02	5680 105-05	5691 026-13	174.1-862

Insert screw must be changed at each insert replacement.  
Accessories to be ordered separately

Number of 5691 026-05 is equal to the number of teeth  
Number of 5691 026-11 is equal to two times the number of teeth  
Number of 5691 026-13 is equal to two times the number of teeth



## Spare parts

### Insert kits



Ordering code	Insert	Quantity	Screw	Quantity
KIT-KPHT150405FR-CM H13A	KPHT 15 04 05 FR-CM H13A	5	5513 020-83	5
KIT-KPHT150408FR-CM H13A	KPHT 15 04 08 FR-CM H13A	5	5513 020-83	5
KIT-KPHT150416FR-CM H13A	KPHT 15 04 16 FR-CM H13A	5	5513 020-83	5
KIT-KPHT150420FR-CM H13A	KPHT 15 04 20 FR-CM H13A	5	5513 020-83	5
KIT-KPHT150425FR-CM H13A	KPHT 15 04 25 FR-CM H13A	5	5513 020-83	5
KIT-KPHT150431FR-CM H13A	KPHT 15 04 31 FR-CM H13A	5	5513 020-83	5
KIT-KPHT150440FR-CM H13A	KPHT 15 04 40 FR-CM H13A	5	5513 020-83	5
KIT-KPHT150450FR-CM H13A	KPHT 15 04 50 FR-CM H13A	5	5513 020-83	5
KIT-KPHX150408FR-CM H13A	KPHX 15 04 08 FR-CM H13A	5	5513 020-83	5
KIT-KPHX150420FR-CM H13A	KPHX 15 04 20 FR-CM H13A	5	5513 020-83	5
KIT-KPHX150431FR-CM H13A	KPHX 15 04 31 FR-CM H13A	5	5513 020-83	5
KIT-KPHX150440FR-CM H13A	KPHX 15 04 40 FR-CM H13A	5	5513 020-83	5

These kits are ordered in a multiple of two. Delivery time is 1-2 weeks.





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