

CoroMill® QD

High-security groove milling and parting off

Application

- Deep grooving
- Parting off
- External and internal machining
- Roughing to finishing

ISO application area:



Benefits and features

- Quality grooves without chip issues
- Very secure tools with great reliability
- Quick and easy insert changes



www.sandvik.coromant.com/coromillqd

Couplings

- Cylindrical shank
- Arbor

Inserts

E- and M-tolerance inserts for a wide range of widths and materials. Inserts with extra long parallel land available for extra high-quality surface finish. Available in steel milling grade GC1130 with Zertivo™ technology for long and predictable tool life.

Driving collar

By using driving collars for extra stability, groove milling with high cutting depth/width ratio (exceeding 15) can be performed with maintained excellent quality.

Smaller driving collars can be used together with face mill adapters in large machining centers as a cost-efficient solution.



Internal coolant

The internal coolant solution provides great chip evacuation. By getting rid of chip issues, surface quality is improved and machining security ensured. Internal coolant also helps regulate the heat at the cutting zone, which is especially beneficial for ISO S materials.



I128



I131

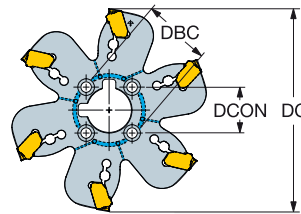
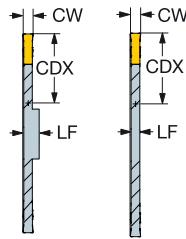


N6

CoroMill® QD indexable grooving and parting off cutter

Arbor - Internal coolant supply

KAPR 90°



SSC: E, F G, H, J, K

							Dimensions, mm									
CW	DC	CDX	SSC	CZC _{MS}	CNSC		Ordering code	DCON	DBC	LF	DRVCT			RPMX	CICT	MID
2.00	80	24.0	E	X10	4	5	QD-EC080X10-M	10.0	22.0	2.65	0	50	0.12	4300	5	QD-NE-0200-020E-PM
	100	30.0	E	X22	4	8	QD-EC100X22-M	22.0	32.0	2.65	2	50	0.14	3900	8	QD-NE-0200-020E-PM
	125	31.0	E	X32	4	10	QD-EC125X32-M	32.0	45.0	2.65	2	50	0.25	3500	10	QD-NE-0200-020E-PM
	160	40.0	E	X40	4	12	QD-EC160X40-M	40.0	63.0	2.65	2	50	0.32	3000	12	QD-NE-0200-020E-PM
2.50	80	24.0	F	X10	4	5	QD-FC080X10-M	10.0	22.0	2.65	0	50	0.13	5000	5	QD-NF-0250-020E-PM
	100	30.0	F	X22	4	8	QD-FC100X22-M	22.0	32.0	2.65	2	50	0.15	4400	8	QD-NF-0250-020E-PM
	125	31.0	F	X32	4	10	QD-FC125X32-M	32.0	45.0	2.65	2	50	0.28	4000	10	QD-NF-0250-020E-PM
	160	40.0	F	X40	4	12	QD-FC160X40-M	40.0	63.0	2.65	2	50	0.36	3500	12	QD-NF-0250-020E-PM
3.00	80	24.0	G	X10	4	5	QD-GC080X10-M	10.0	22.0	2.70	0	70	0.14	6100	5	QD-NG-0300-020E-PM
	100	30.0	G	X22	4	8	QD-GC100X22-M	22.0	32.0	2.70	2	70	0.17	5500	8	QD-NG-0300-020E-PM
	125	31.0	G	X32	4	10	QD-GC125X32-M	32.0	45.0	2.70	2	70	0.30	4900	10	QD-NG-0300-020E-PM
	160	40.0	G	X40	4	12	QD-GC160X40-M	40.0	63.0	2.70	2	70	0.40	4300	12	QD-NG-0300-020E-PM
4.00	80	24.0	H	X10	4	4	QD-HC080X10-M	10.0	22.0	3.65	0	70	0.14	5000	4	QD-NH-0400-025E-PM
	100	30.0	H	X22	4	6	QD-HC100X22-M	22.0	32.0	3.65	2	70	0.19	4400	6	QD-NH-0400-025E-PM
	125	31.0	H	X32	4	8	QD-HC125X32-M	32.0	45.0	3.65	2	70	0.33	4000	8	QD-NH-0400-025E-PM
	160	40.0	H	X40	4	12	QD-HC160X40-M	40.0	63.0	3.65	2	70	0.48	3500	12	QD-NH-0400-025E-PM
5.00	100	30.0	J	X22	4	6	QD-JC100X22-M	22.0	32.0	4.65	2	70	0.22	3800	6	QD-NJ-0500-030E-PM
	125	31.0	J	X32	4	8	QD-JC125X32-M	32.0	45.0	4.65	2	70	0.39	3400	8	QD-NJ-0500-030E-PM
	160	40.0	J	X40	4	10	QD-JC160X40-M	40.0	63.0	4.65	2	70	0.56	3000	10	QD-NJ-0500-030E-PM
6.00	100	30.0	K	X22	4	6	QD-KC100X22-M	22.0	32.0	5.65	2	70	0.24	3900	6	QD-NK-0600-035E-PM
	125	31.0	K	X32	4	8	QD-KC125X32-M	32.0	45.0	5.65	2	70	0.44	3500	8	QD-NK-0600-035E-PM
	160	40.0	K	X40	4	10	QD-KC160X40-M	40.0	63.0	5.65	2	70	0.65	3000	10	QD-NK-0600-035E-PM

Note: coupling X40 uses cap screws, these are included with the adaptor.

Spare parts	
DC	Screw
80.00	5513 015-11
100.00	5513 015-10
125.00	5513 015-09

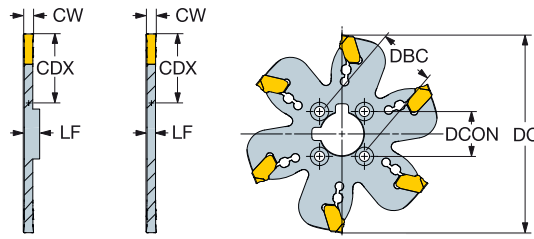
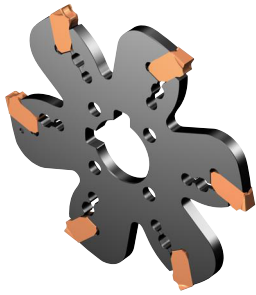
For complete list of spare parts, see www.sandvik.coromant.com



CoroMill® QD indexable grooving and parting off cutter

Arbor

KAPR 90°



SSC: E, F G, H, J, K

										Dimensions, mm				
CW	DC	CDX	SSC	CZC _{MS}		Ordering code	DCON	DBC	LF	DRVCT		RPMX	CICT	MIID
2.00	80	24.0	E	X10	5	QD-E-080X10-M	10.0	22.0	2.65	0	0.12	4300	5	QD-NE-0200-020E-PM
	100	30.0	E	X22	8	QD-E-100X22-M	22.0	32.0	2.65	2	0.14	3900	8	QD-NE-0200-020E-PM
	125	31.0	E	X32	10	QD-E-125X32-M	32.0	45.0	2.65	2	0.25	3500	10	QD-NE-0200-020E-PM
	160	40.0	E	X40	12	QD-E-160X40-M	40.0	63.0	2.65	2	0.32	3000	12	QD-NE-0200-020E-PM
	200	60.0	E	X40	16	QD-E-200X40-M	40.0	63.0	2.65	2	0.64	2700	16	QD-NE-0200-020E-PM
2.50	80	24.0	F	X10	5	QD-F-080X10-M	10.0	22.0	2.65	0	0.13	5000	5	QD-NF-0250-020E-PM
	100	30.0	F	X22	8	QD-F-100X22-M	22.0	32.0	2.65	2	0.16	4400	8	QD-NF-0250-020E-PM
	125	31.0	F	X32	10	QD-F-125X32-M	32.0	45.0	2.65	2	0.28	4000	10	QD-NF-0250-020E-PM
	160	40.0	F	X40	12	QD-F-160X40-M	40.0	63.0	2.65	2	0.36	3500	12	QD-NF-0250-020E-PM
	200	60.0	F	X40	16	QD-F-200X40-M	40.0	63.0	2.65	2	0.73	3100	16	QD-NF-0250-020E-PM
3.00	80	24.0	G	X10	5	QD-G-080X10-M	10.0	22.0	2.70	0	0.14	6100	5	QD-NG-0300-020E-PM
	100	30.0	G	X22	8	QD-G-100X22-M	22.0	32.0	2.70	2	0.17	5500	8	QD-NG-0300-020E-PM
	125	31.0	G	X32	10	QD-G-125X32-M	32.0	45.0	2.70	2	0.30	4900	10	QD-NG-0300-020E-PM
	160	40.0	G	X40	12	QD-G-160X40-M	40.0	63.0	2.70	2	0.40	4300	12	QD-NG-0300-020E-PM
	200	60.0	G	X40	16	QD-G-200X40-M	40.0	63.0	2.70	2	0.79	3800	16	QD-NG-0300-020E-PM
4.00	80	24.0	H	X10	4	QD-H-080X10-M	10.0	22.0	3.65	0	0.15	5000	4	QD-NH-0400-025E-PM
	100	30.0	H	X22	6	QD-H-100X22-M	22.0	32.0	3.65	2	0.19	4400	6	QD-NH-0400-025E-PM
	125	31.0	H	X32	8	QD-H-125X32-M	32.0	45.0	3.65	2	0.34	4000	8	QD-NH-0400-025E-PM
	160	40.0	H	X40	12	QD-H-160X40-M	40.0	63.0	3.65	2	0.48	3500	12	QD-NH-0400-025E-PM
	200	60.0	H	X40	14	QD-H-200X40-M	40.0	63.0	3.65	2	0.94	3100	14	QD-NH-0400-025E-PM
5.00	100	30.0	J	X22	6	QD-J-100X22-M	22.0	32.0	4.65	2	0.22	3800	6	QD-NJ-0500-030E-PM
	125	31.0	J	X32	8	QD-J-125X32-M	32.0	45.0	4.65	2	0.39	3400	8	QD-NJ-0500-030E-PM
	160	40.0	J	X40	10	QD-J-160X40-M	40.0	63.0	4.65	2	0.55	3000	10	QD-NJ-0500-030E-PM
	200	60.0	J	X40	14	QD-J-200X40-M	40.0	63.0	4.65	2	1.10	2700	14	QD-NJ-0500-030E-PM
	250	85.0	J	X40	18	QD-J-250X40-M	40.0	63.0	4.65	2	1.62	2400	18	QD-NJ-0500-030E-PM
6.00	100	30.0	K	X22	6	QD-K-100X22-M	22.0	32.0	5.65	2	0.25	3900	6	QD-NK-0600-035E-PM
	125	31.0	K	X32	8	QD-K-125X32-M	32.0	45.0	5.65	2	0.44	3500	8	QD-NK-0600-035E-PM
	160	40.0	K	X40	10	QD-K-160X40-M	40.0	63.0	5.65	2	0.65	3000	10	QD-NK-0600-035E-PM
	200	60.0	K	X40	14	QD-K-200X40-M	40.0	63.0	5.65	2	1.27	2700	14	QD-NK-0600-035E-PM
	250	85.0	K	X40	18	QD-K-250X40-M	40.0	63.0	5.65	2	1.92	2400	18	QD-NK-0600-035E-PM
315	117.5	K	X40	24	QD-K-315X40-M	40.0	63.0	5.65	2	3.32	2200	24	QD-NK-0600-035E-PM	

Note: coupling X40 uses cap screws, these are included with the adaptor.

Spare parts	
DC	Screw
80.00	5513 015-11
100.00	5513 015-10
125.00	5513 015-09

For complete list of spare parts, see www.sandvik.coromant.com

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L4



N22

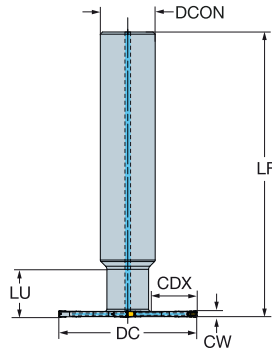
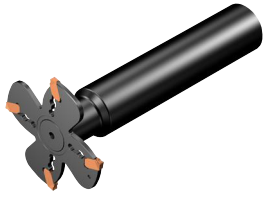


N6

CoroMill® QD indexable grooving and parting off cutter

Cylindrical shank - Internal coolant supply

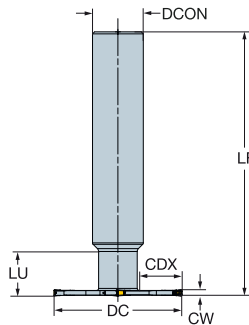
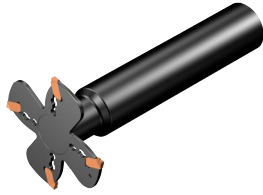
KAPR 90°



							Dimensions, mm								
CW	DC	CDX	SSC	CZC _{MS}	CNSC		Ordering code	DCON	LF	LU			RPMX	CICT	MIID
2.00	63	21.0	E	25	4	4	QD-EC063A25-M	25.0	130.00	23	70	0.67	4900	4	QD-NE-0200-020E-PM
2.50	63	21.0	F	25	4	4	QD-FC063A25-M	25.0	130.00	23	70	0.68	5600	4	QD-NF-0250-020E-PM
3.00	63	21.0	G	25	4	4	QD-GC063A25-M	25.0	130.00	24	70	0.68	6900	4	QD-NG-0300-020E-PM
5.00	80	26.5	J	32	4	4	QD-JC080A32-M	32.0	130.00	26	70	1.05	4200	4	QD-NJ-0500-030E-PM
6.00	80	26.5	K	32	4	4	QD-KC080A32-M	32.0	130.00	27	70	1.06	4300	4	QD-NK-0600-035E-PM

Cylindrical shank

KAPR 90°



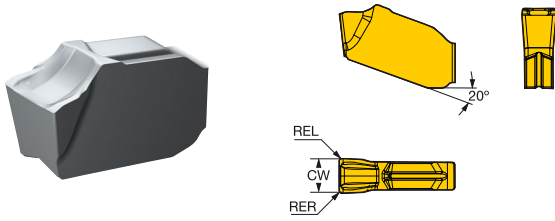
							Dimensions, mm								
CW	DC	CDX	SSC	CZC _{MS}	CNSC		Ordering code	DCON	LF	LU		RPMX	CICT	MIID	
2.00	63	21.0	E	25	4	4	QD-E-063A25-M	25.0	130.00	23	0.69	4900	4	QD-NE-0200-020E-PM	
2.50	63	21.0	F	25	4	4	QD-F-063A25-M	25.0	130.00	23	0.68	5600	4	QD-NF-0250-020E-PM	
3.00	63	21.0	G	25	4	4	QD-G-063A25-M	25.0	130.00	24	0.70	6900	4	QD-NG-0300-020E-PM	
5.00	80	26.5	J	32	4	4	QD-J-080A32-M	32.0	130.00	26	1.08	4200	4	QD-NJ-0500-030E-PM	
6.00	80	26.5	K	32	4	4	QD-K-080A32-M	32.0	130.00	27	1.07	4300	4	QD-NK-0600-035E-PM	

Spare parts
Coolant plug 5643 028-02

For complete list of spare parts, see www.sandvik.coromant.com



CoroMill® QD insert for grooving



SSC	CW	REL	RER	Ordering code	Dimensions, mm											AN	CWTOLL	CWTOLU		
					P		M		K		N		S		H					
					1130	4240	1040	1130	2040	1020	3330	1130	H13A	1130	S30T				S40T	1130
E	2.00	0.10	0.10	QD-NE-0200-010E-NL													7°	0.005	0.055	
	2.00	0.20	0.20	QD-NE-0200-020E-KL													7°	0.005	0.055	
	2.00	0.20	0.20	QD-NE-0200-020E-ML			★										7°	0.005	0.055	
	2.00	0.20	0.20	QD-NE-0200-020E-PL	★	☆		☆						☆			7°	0.005	0.055	
	2.00	0.20	0.20	QD-NE-0200-020E-SL	☆			☆						★			7°	0.005	0.055	
	F	2.39	0.10	0.10	QD-NF-0239-010E-NL													7°	0.005	0.055
		2.39	0.20	0.20	QD-NF-0239-020E-KL													7°	0.005	0.055
		2.39	0.20	0.20	QD-NF-0239-020E-ML			★										7°	0.005	0.055
		2.39	0.20	0.20	QD-NF-0239-020E-PL	★	☆		☆						☆			7°	0.005	0.055
		2.39	0.20	0.20	QD-NF-0239-020E-SL	☆	☆		☆						★			7°	0.005	0.055
		2.50	0.10	0.10	QD-NF-0250-010E-NL													7°	0.005	0.055
		2.50	0.20	0.20	QD-NF-0250-020E-KL													7°	0.005	0.055
2.50		0.20	0.20	QD-NF-0250-020E-ML			★										7°	0.005	0.055	
2.50		0.20	0.20	QD-NF-0250-020E-PL	★	☆		☆						☆			7°	0.005	0.055	
2.50		0.20	0.20	QD-NF-0250-020E-SL	☆			☆						★			7°	0.005	0.055	
G		3.00	0.10	0.10	QD-NG-0300-010E-NL													7°	0.005	0.055
		3.00	0.20	0.20	QD-NG-0300-020E-KL													7°	0.005	0.055
	3.00	0.20	0.20	QD-NG-0300-020E-ML			★										7°	0.005	0.055	
	3.00	0.20	0.20	QD-NG-0300-020E-PL	★	☆		☆						☆			7°	0.005	0.055	
	3.00	0.20	0.20	QD-NG-0300-020E-SL	☆			☆						★			7°	0.005	0.055	
	3.18	0.10	0.10	QD-NG-0318-010E-NL													7°	0.005	0.055	
	3.18	0.20	0.20	QD-NG-0318-020E-KL													7°	0.005	0.055	
	3.18	0.20	0.20	QD-NG-0318-020E-ML			★										7°	0.005	0.055	
	3.18	0.20	0.20	QD-NG-0318-020E-PL	★	☆		☆						☆			7°	0.005	0.055	
	3.18	0.20	0.20	QD-NG-0318-020E-SL	☆			☆						★			7°	0.005	0.055	
	H	4.00	0.15	0.15	QD-NH-0400-015E-NL													7°	0.005	0.055
		4.00	0.25	0.25	QD-NH-0400-025E-KL													7°	0.005	0.055
4.00		0.25	0.25	QD-NH-0400-025E-ML			★										7°	0.005	0.055	
4.00		0.25	0.25	QD-NH-0400-025E-PL	★	☆		☆						☆			7°	0.005	0.055	
4.00		0.25	0.25	QD-NH-0400-025E-SL	☆			☆						★			7°	0.005	0.055	
J	4.76	0.20	0.20	QD-NJ-0476-020E-NL													7°	0.005	0.055	
	4.76	0.30	0.30	QD-NJ-0476-030E-KL													7°	0.005	0.055	
	4.76	0.30	0.30	QD-NJ-0476-030E-ML			★										7°	0.005	0.055	
	4.76	0.30	0.30	QD-NJ-0476-030E-PL	★	☆		☆						☆			7°	0.005	0.055	
	4.76	0.30	0.30	QD-NJ-0476-030E-SL	☆			☆						★			7°	0.005	0.055	
	5.00	0.20	0.20	QD-NJ-0500-020E-NL													7°	0.005	0.055	
	5.00	0.30	0.30	QD-NJ-0500-030E-KL													7°	0.005	0.055	
	5.00	0.30	0.30	QD-NJ-0500-030E-ML			★										7°	0.005	0.055	
	5.00	0.30	0.30	QD-NJ-0500-030E-PL	★	☆		☆						☆			7°	0.005	0.055	
	5.00	0.30	0.30	QD-NJ-0500-030E-SL	☆			☆						★			7°	0.005	0.055	
K	6.00	0.25	0.25	QD-NK-0600-025E-NL													7°	0.005	0.055	
	6.00	0.35	0.35	QD-NK-0600-035E-KL													7°	0.005	0.055	
	6.00	0.35	0.35	QD-NK-0600-035E-ML			★										7°	0.005	0.055	
	6.00	0.35	0.35	QD-NK-0600-035E-PL	★	☆		☆						☆			7°	0.005	0.055	
	6.00	0.35	0.35	QD-NK-0600-035E-SL	☆			☆						★			7°	0.005	0.055	
	6.35	0.25	0.25	QD-NK-0635-025E-NL													7°	0.005	0.055	
	6.35	0.35	0.35	QD-NK-0635-035E-KL													7°	0.005	0.055	
	6.35	0.35	0.35	QD-NK-0635-035E-ML			★										7°	0.005	0.055	
	6.35	0.35	0.35	QD-NK-0635-035E-PL	★	☆		☆						☆			7°	0.005	0.055	
	6.35	0.35	0.35	QD-NK-0635-035E-SL	☆			☆						★			7°	0.005	0.055	



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N22

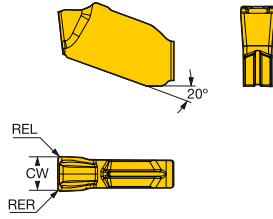


N6



N10

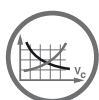
CoroMill® QD insert for grooving



SSC	CW	REL	RER	Ordering code	Dimensions, mm													
					P			M		K	N	S		H				
					1130	4240	1040	1130	2040	1020	3330	1130	H13A	S90T	S40T	1130		
E	2.00	0.20	0.20	QD-NE-0200-020E-MM	★		★									7°	0.005	0.055
	2.00	0.20	0.20	QD-NE-0200-020E-PM	★		☆									7°	0.005	0.055
	2.00	0.20	0.20	QD-NE-0200-020E-SM	☆			☆					★	☆	☆	7°	0.005	0.055
	2.00	0.20	0.20	QD-NE-0200-020M-PM	★			☆					☆		☆	7°	0.005	0.105
	2.00	0.35	0.35	QD-NE-0200-035M-KM						★						7°	0.005	0.105
F	2.39	0.20	0.20	QD-NF-0239-020E-MM			★	☆								7°	0.005	0.055
	2.39	0.20	0.20	QD-NF-0239-020E-PM	★	☆		☆					☆		☆	7°	0.005	0.055
	2.39	0.20	0.20	QD-NF-0239-020E-SM	☆			☆					★	☆	☆	7°	0.005	0.055
	2.39	0.20	0.20	QD-NF-0239-020M-PM	★	☆		☆					☆		☆	7°	0.005	0.105
	2.39	0.35	0.35	QD-NF-0239-035M-KM						★						7°	0.005	0.105
	2.50	0.20	0.20	QD-NF-0250-020E-MM			★	☆								7°	0.005	0.055
	2.50	0.20	0.20	QD-NF-0250-020E-PM	★	☆		☆					☆		☆	7°	0.005	0.055
	2.50	0.20	0.20	QD-NF-0250-020E-SM	☆			☆					★	☆	☆	7°	0.005	0.055
	2.50	0.20	0.20	QD-NF-0250-020M-PM	★	☆		☆					☆		☆	7°	0.005	0.105
	2.50	0.35	0.35	QD-NF-0250-035M-KM						★						7°	0.005	0.105
G	3.00	0.20	0.20	QD-NG-0300-020E-MM			★	☆								7°	0.005	0.055
	3.00	0.20	0.20	QD-NG-0300-020E-PM	★	☆		☆					☆		☆	7°	0.005	0.055
	3.00	0.20	0.20	QD-NG-0300-020E-SM	☆			☆					★	☆	☆	7°	0.005	0.055
	3.00	0.20	0.20	QD-NG-0300-020M-PM	★	☆		☆					☆		☆	7°	0.005	0.105
	3.00	0.35	0.35	QD-NG-0300-035M-KM						★						7°	0.005	0.105
	3.18	0.20	0.20	QD-NG-0318-020E-MM			★	☆								7°	0.005	0.055
	3.18	0.20	0.20	QD-NG-0318-020E-PM	★	☆		☆					☆		☆	7°	0.005	0.055
	3.18	0.20	0.20	QD-NG-0318-020E-SM	☆			☆					★	☆	☆	7°	0.005	0.055
	3.18	0.20	0.20	QD-NG-0318-020M-PM	★	☆		☆					☆		☆	7°	0.005	0.105
	3.18	0.35	0.35	QD-NG-0318-035M-KM						★						7°	0.005	0.105
H	4.00	0.25	0.25	QD-NH-0400-025E-MM			★	☆								7°	0.005	0.055
	4.00	0.25	0.25	QD-NH-0400-025E-PM	★	☆		☆					☆		☆	7°	0.005	0.055
	4.00	0.25	0.25	QD-NH-0400-025E-SM	☆			☆					★	☆	☆	7°	0.005	0.055
	4.00	0.25	0.25	QD-NH-0400-025M-PM	★	☆		☆					☆		☆	7°	0.005	0.105
	4.00	0.40	0.40	QD-NH-0400-040M-KM						★						7°	0.005	0.105
J	4.76	0.30	0.30	QD-NJ-0476-030E-MM			★	☆								7°	0.005	0.055
	4.76	0.30	0.30	QD-NJ-0476-030E-PM	★	☆		☆					☆		☆	7°	0.005	0.055
	4.76	0.30	0.30	QD-NJ-0476-030E-SM	☆			☆					★	☆	☆	7°	0.005	0.055
	4.76	0.30	0.30	QD-NJ-0476-030M-PM	★	☆		☆					☆		☆	7°	0.005	0.105
	4.76	0.45	0.45	QD-NJ-0476-045M-KM						★						7°	0.005	0.105
	5.00	0.30	0.30	QD-NJ-0500-030E-MM			★	☆								7°	0.005	0.055
	5.00	0.30	0.30	QD-NJ-0500-030E-PM	★	☆		☆					☆		☆	7°	0.005	0.055
	5.00	0.30	0.30	QD-NJ-0500-030E-SM	☆			☆					★	☆	☆	7°	0.005	0.055
	5.00	0.30	0.30	QD-NJ-0500-030M-PM	★	☆		☆					☆		☆	7°	0.005	0.105
	5.00	0.45	0.45	QD-NJ-0500-045M-KM						★						7°	0.005	0.105
K	6.00	0.35	0.35	QD-NK-0600-035E-MM			★	☆								7°	0.005	0.055
	6.00	0.35	0.35	QD-NK-0600-035E-PM	★	☆		☆					☆		☆	7°	0.005	0.055
	6.00	0.35	0.35	QD-NK-0600-035E-SM	☆			☆					★	☆	☆	7°	0.005	0.055
	6.00	0.35	0.35	QD-NK-0600-035M-PM	★	☆		☆					☆		☆	7°	0.005	0.105
	6.00	0.50	0.50	QD-NK-0600-050M-KM						★						7°	0.005	0.105
	6.35	0.35	0.35	QD-NK-0635-035E-MM			★	☆								7°	0.005	0.055
	6.35	0.35	0.35	QD-NK-0635-035E-PM	★	☆		☆					☆		☆	7°	0.005	0.055
	6.35	0.35	0.35	QD-NK-0635-035E-SM	☆			☆					★	☆	☆	7°	0.005	0.055
	6.35	0.35	0.35	QD-NK-0635-035M-PM	★	☆		☆					☆		☆	7°	0.005	0.105
	6.35	0.50	0.50	QD-NK-0635-050M-KM						★						7°	0.005	0.105
E	2.00	0.35	0.35	QD-NE-0200-035M-PH	☆	★		☆					☆		☆	7°	0.005	0.105
F	2.39	0.35	0.35	QD-NF-0239-035M-PH	☆	★		☆					☆		☆	7°	0.005	0.105
	2.50	0.35	0.35	QD-NF-0250-035M-PH	☆	★		☆					☆		☆	7°	0.005	0.105
G	3.00	0.35	0.35	QD-NG-0300-035M-PH	☆	★		☆					☆		☆	7°	0.005	0.105
	3.18	0.35	0.35	QD-NG-0318-035M-PH	☆	★		☆					☆		☆	7°	0.005	0.105
H	4.00	0.40	0.40	QD-NH-0400-040M-PH	☆	★		☆					☆		☆	7°	0.005	0.105
J	4.76	0.45	0.45	QD-NJ-0476-045M-PH	☆	★		☆					☆		☆	7°	0.005	0.105
	5.00	0.45	0.45	QD-NJ-0500-045M-PH	☆	★		☆					☆		☆	7°	0.005	0.105
K	6.00	0.50	0.50	QD-NK-0600-050M-PH	☆	★		☆					☆		☆	7°	0.005	0.105
	6.35	0.50	0.50	QD-NK-0635-050M-PH	☆	★		☆					☆		☆	7°	0.005	0.105



1128



1146



1168



N22



N6



N10