

## SOLID CARBIDE REAMERS · MICRO REAMERS



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Art.	Solid carbide reamers		Material				HSC High-Speed Cutting	HRC < 45	HRC < 50
22 1450	Ø 0.200 - 0.595		 MICRO GRAIN	310		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
22 1452	Ø 0.60 - 3.50		 MICRO GRAIN	311		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
22 1490	Ø 1.0 - 12.0		MICRO GRAIN	312	<input checked="" type="checkbox"/>				

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- Stock tool
- No stock tool. Price and delivery on request
- ☑ Short delivery times possible when blanks are in stock.
- 🏷 Sale item. While stocks last. No returns.

HRC < 55	HRC < 60	HRC < 65	HRC < 70	STEEL < 800 N/mm <sup>2</sup>	INOX stainless steel	INCONEL HASTELLOY TITANIUM	GJL	GJS	GTW GTS	NON- FERROUS METALS	short chip	long chip	WITH INTERIOR COOLING	WITHOUT INTERIOR COOLING	DIN 6535 Shape HA	DIN 6535 Shape HE	DIN 6535 Shape HAK	DIN 6535 Shape HEK	
				✓	✓	✓	✓	✓		✓	✓	✓		✓	✓				
				✓	✓		✓	✓		✓	✓	✓		✓	✓				
✓	✓	✓	✓				✓	✓			✓			✓	✓				

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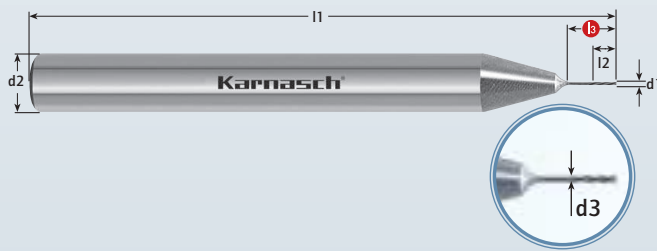


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## 22 1450 Miniature Micro Grain high-speed reamers / HSR. Left hand spiral fluted, right hand cutting

<b>HRC &lt; 45</b>	<b>Alu-minium</b>
<b>INOX</b> stainless steel < 900 N/mm <sup>2</sup> ferritic	<b>Brass</b>
<b>INOX</b> stainless steel > 900 N/mm <sup>2</sup> martensitic	<b>Copper</b>
<b>INOX</b> stainless steel < 900 N/mm <sup>2</sup> austenitic	<b>short chip</b>
<b>GG/G</b> cast iron	<b>long chip</b>
<b>TITANIUM</b> < 1100 N/mm <sup>2</sup>	



<b>MICRO GRAIN</b>	<b>KARNASCH NORM</b>
<b>SPECIAL</b>	<b>DIN 6535 Shape HA</b>
	<b>HSR HIGH SPEED REAMERS</b>
	<b>POLISHED</b>

Cutting data



Art.	d1 ± 0.001	l3	d2 h6	l1	l2 / - 0.1	d3 -0.001	Z
22 1450 0200	• 0.200	2.0	3.0	40	1.0	0.199	4
22 1450 0205	• 0.205	2.0	3.0	40	1.0	0.204	4
22 1450 0210	• 0.210	2.0	3.0	40	1.0	0.209	4
22 1450 0215	• 0.215	2.0	3.0	40	1.0	0.214	4
22 1450 0220	• 0.220	2.0	3.0	40	1.0	0.219	4
22 1450 0225	• 0.225	2.0	3.0	40	1.0	0.224	4
22 1450 0230	• 0.230	2.0	3.0	40	1.0	0.229	4
22 1450 0235	• 0.235	2.0	3.0	40	1.0	0.234	4
22 1450 0240	• 0.240	2.0	3.0	40	1.0	0.239	4
22 1450 0245	• 0.245	2.0	3.0	40	1.0	0.244	4
22 1450 0250	• 0.250	2.5	3.0	40	1.2	0.249	4
22 1450 0255	• 0.255	2.5	3.0	40	1.2	0.254	4
22 1450 0260	• 0.260	2.5	3.0	40	1.2	0.259	4
22 1450 0265	• 0.265	2.5	3.0	40	1.2	0.264	4
22 1450 0270	• 0.270	2.5	3.0	40	1.2	0.269	4
22 1450 0275	• 0.275	2.5	3.0	40	1.2	0.274	4
22 1450 0280	• 0.280	2.5	3.0	40	1.2	0.279	4
22 1450 0285	• 0.285	2.5	3.0	40	1.2	0.284	4
22 1450 0290	• 0.290	2.5	3.0	40	1.2	0.289	4
22 1450 0295	• 0.295	2.5	3.0	40	1.2	0.294	4
22 1450 0300	• 0.300	3.0	3.0	40	1.5	0.299	4
22 1450 0305	• 0.305	3.0	3.0	40	1.5	0.304	4
22 1450 0310	• 0.310	3.0	3.0	40	1.5	0.309	4
22 1450 0315	• 0.315	3.0	3.0	40	1.5	0.314	4
22 1450 0320	• 0.320	3.0	3.0	40	1.5	0.319	4
22 1450 0325	• 0.325	3.0	3.0	40	1.5	0.324	4
22 1450 0330	• 0.330	3.0	3.0	40	1.5	0.329	4
22 1450 0335	• 0.335	3.0	3.0	40	1.5	0.334	4
22 1450 0340	• 0.340	3.0	3.0	40	1.5	0.339	4
22 1450 0345	• 0.345	3.0	3.0	40	1.5	0.344	4
22 1450 0350	• 0.350	3.5	3.0	40	1.8	0.349	4
22 1450 0355	• 0.355	3.5	3.0	40	1.8	0.354	4
22 1450 0360	• 0.360	3.5	3.0	40	1.8	0.359	4
22 1450 0365	• 0.365	3.5	3.0	40	1.8	0.364	4
22 1450 0370	• 0.370	3.5	3.0	40	1.8	0.369	4
22 1450 0375	• 0.375	3.5	3.0	40	1.8	0.374	4
22 1450 0380	• 0.380	3.5	3.0	40	1.8	0.379	4
22 1450 0385	• 0.385	3.5	3.0	40	1.8	0.384	4
22 1450 0390	• 0.390	3.5	3.0	40	1.8	0.389	4
22 1450 0395	• 0.395	3.5	3.0	40	1.8	0.394	4

Art.	d1 ± 0.001	l3	d2 h6	l1	l2 / - 0.1	d3 -0.001	Z
22 1450 0400	• 0.400	4.0	3.0	40	2.0	0.399	4
22 1450 0405	• 0.405	4.0	3.0	40	2.0	0.404	4
22 1450 0410	• 0.410	4.0	3.0	40	2.0	0.409	4
22 1450 0415	• 0.415	4.0	3.0	40	2.0	0.414	4
22 1450 0420	• 0.420	4.0	3.0	40	2.0	0.419	4
22 1450 0425	• 0.425	4.0	3.0	40	2.0	0.424	4
22 1450 0430	• 0.430	4.0	3.0	40	2.0	0.429	4
22 1450 0435	• 0.435	4.0	3.0	40	2.0	0.434	4
22 1450 0440	• 0.440	4.0	3.0	40	2.0	0.439	4
22 1450 0445	• 0.445	4.0	3.0	40	2.0	0.444	4
22 1450 0450	• 0.450	4.0	3.0	40	2.0	0.449	4
22 1450 0455	• 0.455	4.0	3.0	40	2.0	0.454	4
22 1450 0460	• 0.460	4.0	3.0	40	2.0	0.459	4
22 1450 0465	• 0.465	4.0	3.0	40	2.0	0.464	4
22 1450 0470	• 0.470	4.0	3.0	40	2.0	0.469	4
22 1450 0475	• 0.475	4.0	3.0	40	2.0	0.474	4
22 1450 0480	• 0.480	4.0	3.0	40	2.0	0.479	4
22 1450 0485	• 0.485	4.0	3.0	40	2.0	0.484	4
22 1450 0490	• 0.490	4.0	3.0	40	2.0	0.489	4
22 1450 0495	• 0.495	4.0	3.0	40	2.0	0.494	4
22 1450 0500	• 0.500	5.0	3.0	40	2.4	0.499	4
22 1450 0505	• 0.505	5.0	3.0	40	2.4	0.504	4
22 1450 0510	• 0.510	5.0	3.0	40	2.4	0.509	4
22 1450 0515	• 0.515	5.0	3.0	40	2.4	0.514	4
22 1450 0520	• 0.520	5.0	3.0	40	2.4	0.519	4
22 1450 0525	• 0.525	5.0	3.0	40	2.4	0.524	4
22 1450 0530	• 0.530	5.0	3.0	40	2.4	0.529	4
22 1450 0535	• 0.535	5.0	3.0	40	2.4	0.534	4
22 1450 0540	• 0.540	5.0	3.0	40	2.4	0.539	4
22 1450 0545	• 0.545	5.0	3.0	40	2.4	0.544	4
22 1450 0550	• 0.550	5.0	3.0	40	2.4	0.549	4
22 1450 0555	• 0.555	5.0	3.0	40	2.4	0.554	4
22 1450 0560	• 0.560	5.0	3.0	40	2.4	0.559	4
22 1450 0565	• 0.565	5.0	3.0	40	2.4	0.564	4
22 1450 0570	• 0.570	5.0	3.0	40	2.4	0.569	4
22 1450 0575	• 0.575	5.0	3.0	40	2.4	0.574	4
22 1450 0580	• 0.580	5.0	3.0	40	2.4	0.579	4
22 1450 0585	• 0.585	5.0	3.0	40	2.4	0.584	4
22 1450 0590	• 0.590	5.0	3.0	40	2.4	0.589	4
22 1450 0595	• 0.595	5.0	3.0	40	2.4	0.594	4

• stock

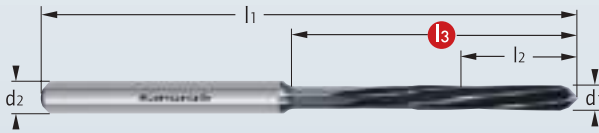
□ All dimensions available in µm-steps / Delivery time without coating 5 working days / with coating 8 working days



Miniature Micro Grain high-speed reamers / HPC. Left hand spiral fluted, right hand cutting

22 1452

<b>HRC &lt; 45</b>	Brass
<b>INOX</b> stainless steel < 900 N/mm <sup>2</sup> ferritic	Copper
<b>INOX</b> stainless steel > 900 N/mm <sup>2</sup> martensitic	Gold
<b>INOX</b> stainless steel < 900 N/mm <sup>2</sup> austenitic	short chip
<b>GG/G</b> cast iron	long chip
<b>Alu- minium</b>	



<b>MICRO GRAIN</b>	KARNASCH NORM
<b>SPECIAL</b>	Shape HA
	30° 7°
	<b>HPC</b>
	<b>POLISHED</b>

Intermediate sizes and special tolerances are available at short notice on request.

Cutting data



Art.	d1		l3	d2	l1	l2	Z
22 1452 0080	% 0.80	+0.003	10	0.80	34	7	4
22 1452 0090	% 0.90	+0.003	10	0.90	34	7	4
22 1452 0098	% 0.98	+0.004	21	4.0	50	6	3
22 1452 0101	% 1.01	+0.004	21	4.0	50	6	3
22 1452 0102	% 1.02	+0.004	21	4.0	50	6	3
22 1452 0103	% 1.03	+0.004	21	4.0	50	6	3
22 1452 0148	% 1.48	+0.004	21	4.0	50	9	3
22 1452 0160	% 1.60 H7		21	4.0	50	12	3
22 1452 0201	% 2.01	+0.004	21	4.0	50	12	4
22 1452 0248	% 2.48	+0.004	31	4.0	60	16	4
22 1452 0249	% 2.49	+0.004	31	4.0	60	16	4
22 1452 0250	% 2.50 H7		31	4.0	60	16	4
22 1452 0280	% 2.80 H7		35	4.0	63	16	6
22 1452 0297	% 2.97	+0.004	35	4.0	63	16	6
22 1452 0298	% 2.98	+0.004	35	4.0	63	16	6
22 1452 0302	% 3.02	+0.004	35	4.0	63	16	6
22 1452 0303	% 3.03	+0.004	35	4.0	63	16	6

% Sale item. While stocks last.



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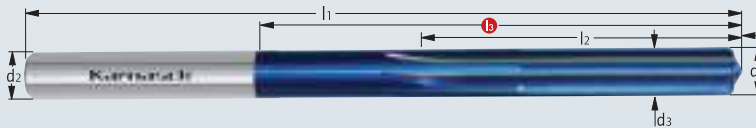
22 1490

Micro grain machine reamers for high hard material HHC < 67 HRC straight fluted, right hand cut

HRC 55-67

GJL

GJS



<b>MICRO GRAIN</b>	KARNASCH NORM
<b>SPECIAL</b>	DIN 6535 Shape HA
	30° 0°
	<b>HHC</b>
	<b>FX-70</b>

Art.	d1 H7	l3	d2 h7	l2	l1	Z
22 1490 0297	• 2.97	30	4	16	65	4
22 1490 0298	• 2.98	30	4	16	65	4
22 1490 0299	• 2.99	30	4	16	65	4
22 1490 0300	• 3.00	30	4	16	65	4
22 1490 0301	• 3.01	30	4	16	65	4
22 1490 0302	• 3.02	30	4	16	65	4
22 1490 0303	• 3.03	30	4	16	65	4
22 1490 0397	• 3.97	40	4	20	75	4
22 1490 0398	• 3.98	40	4	20	75	4
22 1490 0399	• 3.99	40	4	20	75	4
22 1490 0400	• 4.00	40	4	20	75	4
22 1490 0401	• 4.01	40	4	20	75	4
22 1490 0402	• 4.02	40	4	20	75	4
22 1490 0403	• 4.03	40	4	20	75	4
22 1490 0497	• 4.97	50	6	25	92	6
22 1490 0498	• 4.98	50	6	25	92	6
22 1490 0499	• 4.99	50	6	25	92	6
22 1490 0500	• 5.00	50	6	25	92	6
22 1490 0501	• 5.01	50	6	25	92	6
22 1490 0502	• 5.02	50	6	25	92	6
22 1490 0503	• 5.03	50	6	25	92	6
22 1490 0597	• 5.97	50	6	25	92	6
22 1490 0598	• 5.98	50	6	25	92	6
22 1490 0599	• 5.99	50	6	25	92	6
22 1490 0600	• 6.00	50	6	25	92	6
22 1490 0601	• 6.01	50	6	25	92	6
22 1490 0602	• 6.02	50	6	25	92	6
22 1490 0603	• 6.03	50	6	25	92	6
22 1490 0797	• 7.97	75	8	30	115	6
22 1490 0798	• 7.98	75	8	30	115	6
22 1490 0799	• 7.99	75	8	30	115	6
22 1490 0800	• 8.00	75	8	30	115	6
22 1490 0801	• 8.01	75	8	30	115	6
22 1490 0802	• 8.02	75	8	30	115	6
22 1490 0803	• 8.03	75	8	30	115	6
22 1490 0997	• 9.97	85	10	40	130	6
22 1490 0998	• 9.98	85	10	40	130	6
22 1490 0999	• 9.99	85	10	40	130	6
22 1490 1000	• 10.00	85	10	40	130	6
22 1490 1001	• 10.01	85	10	40	130	6
22 1490 1002	• 10.02	85	10	40	130	6
22 1490 1003	• 10.03	85	10	40	130	6
22 1490 1197	• 11.97	100	12	45	150	6
22 1490 1198	• 11.98	100	12	45	150	6
22 1490 1199	• 11.99	100	12	45	150	6
22 1490 1200	• 12.00	100	12	45	150	6
22 1490 1201	• 12.01	100	12	45	150	6
22 1490 1202	• 12.02	100	12	45	150	6
22 1490 1203	• 12.03	100	12	45	150	6

Intermediate dimensions available on request

Cutting data

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