

# Drilling compacts and nozzles

## Grade Specifications and Comparison Chart



### Cemented Tungsten Carbide Grades Used in Oil & Gas, Mining, and Construction Applications

Kennametal Grade Name	Alternate or Legacy Name	Grain Family	Cobalt %	Hardness		Density (g/cm <sup>3</sup> )	TRS (ksi)	B611 Wear Resistance (volume loss in mm <sup>3</sup> )	Palmqvist Toughness (ksi in <sup>1/2</sup> )	B771 Fracture Toughness (ksi in <sup>1/2</sup> )
				HRA	HV30 (estimated)					
KHM42	K3076/P40	Medium	6	91.1	1485	14.95	515	45	10.1	9.9
KHM33	374/290/295	Medium	6	90.6	1420	14.95	510	60	10.3	11.0
KHM24	K3075/378	Medium	6	90.2	1370	14.95	480	85	10.5	11.9
KHC33	397/AF63	Coarse	6	89.0	1245	14.93	420	130	11.7	14.3
KHC35	308	Coarse	8	88.9	1235	14.74	480	135	12.7	13.7
KHC44	91	Coarse	8.5	89.2	1265	14.68	470	155	12.5	13.9
KHM27	400/NM3/MO9	Medium	9	89.9	1335	14.60	515	90	11.2	10.9
KHM36	393/386	Medium	9	89.6	1305	14.64	560	120	11.5	12.9
KHC45	376	Coarse	9	88.9	1235	14.64	490	140	12.7	13.2
KHC46	383	Coarse	10	89.2	1265	14.53	540	150	13.1	13.6
KHC55	651/241	Coarse	10	88.6	1210	14.52	485	190	14.3	15.5
KHC37	362	Coarse	10	87.9	1150	14.53	460	210	14.8	15.2
KHC28	380/231	Coarse	10	87.7	1130	14.52	460	215	15.8	16.0
KHC91	610	Coarse	10	87.3	1100	14.53	475	210	—	—
KHM38	248/363W	Medium	11	89.7	1315	14.43	545	125	11.5	11.3
KHC65	367/941	Coarse	11	88.6	1210	14.42	525	175	13.4	12.8
KHC29	931	Coarse	11	88.1	1165	14.42	495	200	14.9	14.3
KHC47	349	Coarse	11	87.7	1130	14.42	455	225	15.4	15.1
KHC39	355	Coarse	12	87.1	1085	14.33	465	255	18.4	16.3
KHE39	120V/365	Extra Coarse	12	86.6	1045	14.32	455	285	22.5	18.2
KHE86	MN1	Extra Coarse	13.5	85.1	945	14.18	395	355	—	—
KHC68	387	Coarse	14	88.0	1155	14.13	517	280	16.3	13.0
KHC59	369	Coarse	14	86.3	1025	14.13	445	335	21.1	17.4
KHE77	147	Extra Coarse	14	85.7	985	14.13	430	370	—	19.2
KHC97	375/55B	Coarse	16	86.7	1055	13.94	495	360	19.5	16.1
KHC88	368/45B	Coarse	16	85.8	990	13.94	460	380	—	17.4
KHC20	352	Coarse	20	85.6	980	13.57	500	460	—	16.5

*Kennametal application specialists should be consulted to assist in grade selection. Application suitability should be evaluated from initial field performance.*

*Grade properties listed are nominal values and are subject to change or upgrade without notice.*

#### CONTACT FOR MORE INFORMATION:

Tel: +1 800 433 7295  
 Fax: +1 479 619 4813  
 k-rgrs.cs@kennametal.com

## Quick Reference Key for Grade Nomenclature

**Example:** KHC37 = 10% cobalt binder with coarse grain structure

K	H	C	37
Brand	Binder/Primary Market	Grain Size	Binder Content
K = Kennametal	H = Cobalt/Compacts for Oil & Gas, Mining, and Construction	N = < 0.2 $\mu\text{m}$ Nano U = 0.2–0.5 $\mu\text{m}$ Ultrafine S = 0.5–0.8 $\mu\text{m}$ Submicron F = 0.8–1.3 $\mu\text{m}$ Fine M = 1.3–2.5 $\mu\text{m}$ Medium C = 2.5–6.0 $\mu\text{m}$ Coarse E = > 6.0 $\mu\text{m}$ Extra Coarse	XY = Sum of X + Y = Binder % (Up to 18 %) 06 = 6% 15 = 6% 67 = 13%

