

# MASTER CATALOG 2018

VOLUME ONE | **TURNING TOOLS**



ISO/ANSI TURNING | GROOVING & CUT-OFF | THREADING | APPLICATION SPECIFIC

# ➤ Tunable Boring Bars

With Front End KM™ Quick-Change Adapter

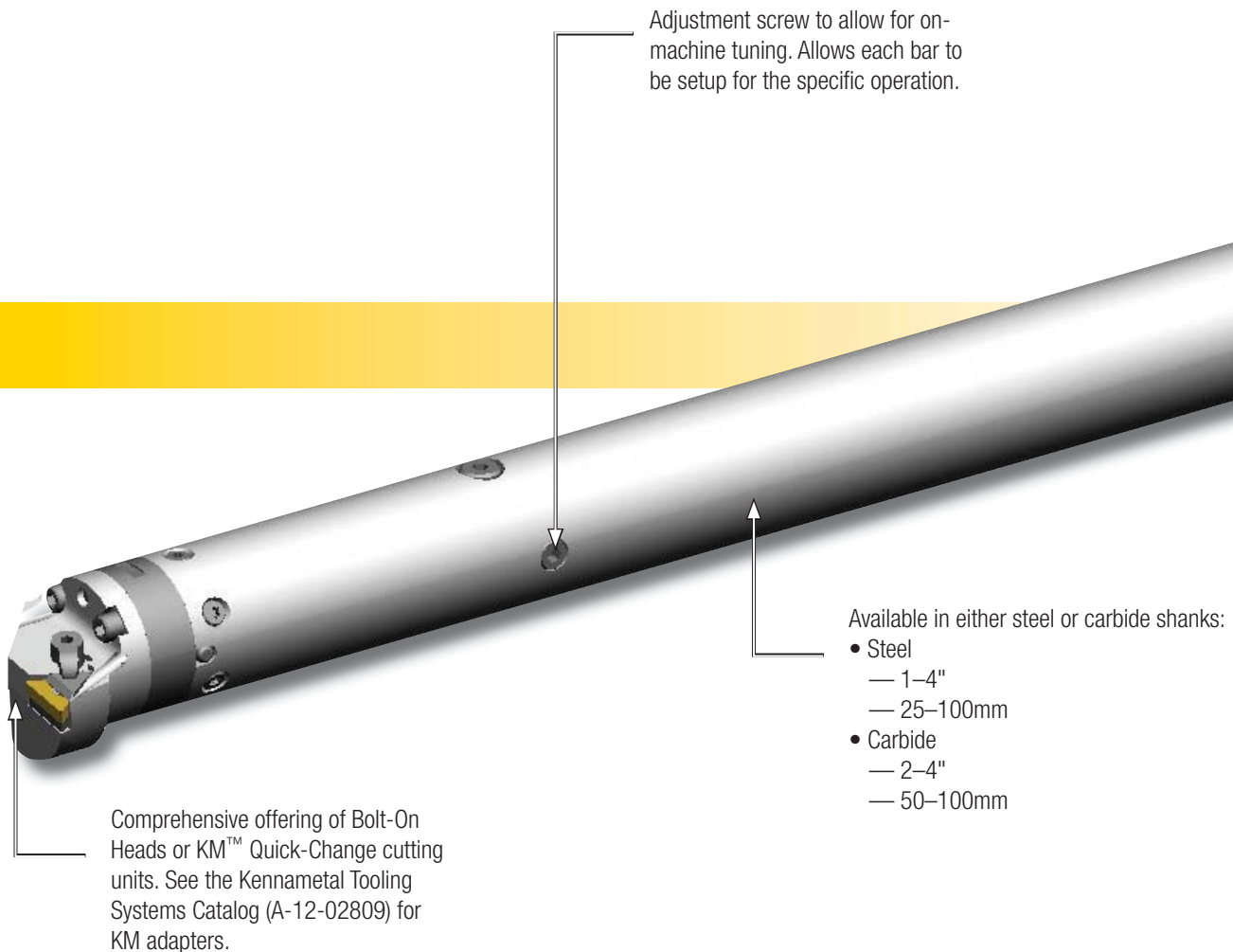
Kennametal offers a portfolio of tunable boring bars to increase productivity and solve chatter and other issues in long-boring operations.

## Features, Functions, and Benefits

Features	Functions	Benefits
Robust internal clamping package	<ul style="list-style-type: none"> <li>• Eliminates chatter and vibration.</li> <li>• Higher metal removal rate.</li> <li>• Larger depths of cut.</li> </ul>	<ul style="list-style-type: none"> <li>• High surface quality.</li> <li>• Low scrap rate.</li> <li>• Increased productivity.</li> <li>• Reduced noise exposure.</li> </ul>
Tunable clamping mechanism	Bar can be tuned on the machine with just the turn of a screw.	Optimized damping characteristics for all kinds of machining conditions.
KM Quick-Change front end adapter	<ul style="list-style-type: none"> <li>• Ridged clamping system.</li> <li>• Wide selection of KM Quick-Change cutting units.</li> </ul>	Flexible system reduces tooling inventory and setup times.

**Kennametal has made several key improvements to our current tunable boring bar portfolio:**

- Enhanced standardized tuning process at the manufacturing plant ensures bars are accurately tuned at the maximum overhang.
- Nitriding of steel tunable boring bars to eliminate the effects of chip wash.
- Elimination of flats on tunable boring bars enhances stability and promotes proper toolholding.
- Addition of a small flat on the connection collar enables the use of a center-height tool.
- Enhanced assembly process.



## ■ Appearance of the Tunable Boring Bars

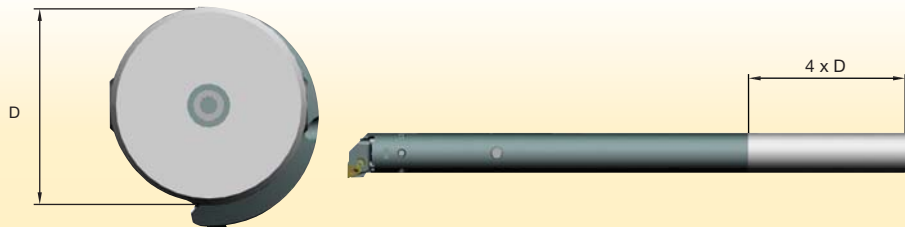
- NEW All tunable boring bars are tuned at the manufacturing plant and delivered to the customer with the tune specified at the maximum overhang of the bar.
- NEW All steel tunable bars undergo a nitriding process to help prevent chip wash damage to the bar and extend the bar's tool life.
- The nitride process of the black oxide steel tunable boring bars gives the shanks a bluish tint. These bars are through-coolant capable and use bolt-on heads or KM™ Quick-Change cutting adapters. There is a set screw to tune the bar.
- Tunable boring bars with carbide shanks will appear gray in color. They are through-coolant capable and use KM Quick-Change cutting adapters. There is a set screw to tune the bar.

## ■ Application Recommendations

- Choose a boring bar as big as possible, but make sure there is adequate space for the chip evacuation.
- Balance the machining settings to avoid uncontrollable vibrations.
- Keep the L/D ratio as small as possible.
- Bar comes pre-tuned, but can be adjusted by hand.

### 1 Holding the Bar

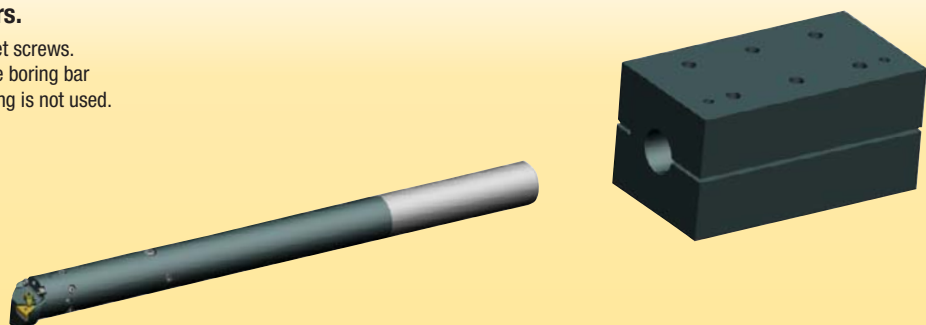
- Hold the bar correctly. Kennametal recommends holding the bar at  $4 \times D$ .



### 2 Kennametal recommends holding the boring bar in a split-style holder, with a split-style reducer if needed, with an ISO H7 diametral tolerance.

### 3 NEW: All flats have been removed from steel tunable boring bars.

- Do not clamp the bars with set screws.
- Kennametal cannot guarantee boring bar performance if proper clamping is not used.

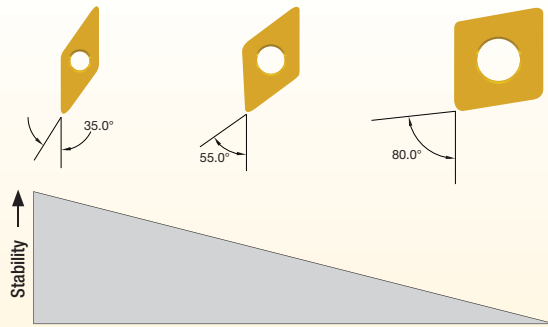


### 4 Tunable boring bars are designed and pre-tuned at the maximum overhang.

- Steel bars: pre-tuned to  $10 \times D$ ; use as low as  $6 \times D$ .
- Carbide composite bars: pre-tuned to  $15 \times D$ ; use as low as  $12 \times D$ .
- Re-tuning may be necessary if the boring bar is not used at its pre-tuned overhang.
- Never clamp or use the boring bar below its minimum overhang.

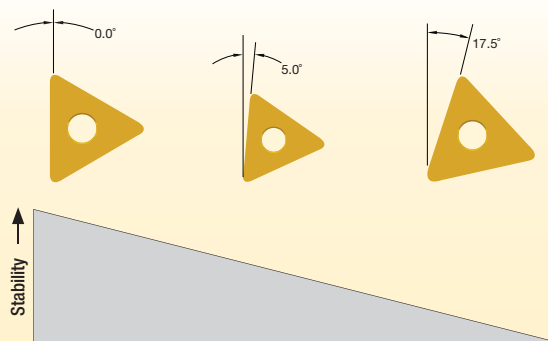
## 5 Insert Angle

- Smaller point angles produce consistent chip sizes and increase bore clearance for better chip evacuation.
- Larger point angles may cause rubbing due to larger cutting edge, which can result in vibration.



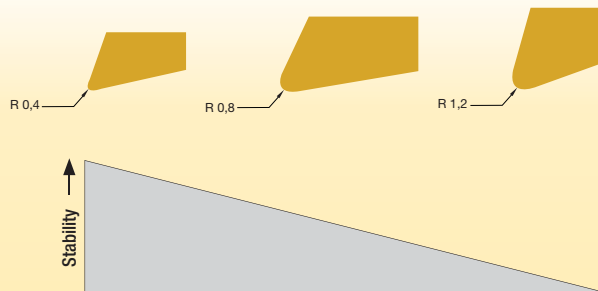
## 6 Lead Angle

- Choose a lead angle as close to 0° as possible for increased stability.



## 7 Nose Radius

- Choose a small nose radius for better stability.
- Depth of cut should be larger than the nose radius.



## 8 Insert Geometries

- Use positive, free-flowing insert geometries and sharp edge preps to reduce cutting forces.
- Use PVD inserts as a first choice because thinner coating keeps edge prep smaller.

## 9 Center Cutting Height

- Cutting height tolerances are +/- .005".
- Kennametal recommends using our new center height alignment tool kit. The kit includes a magnet, a seat, and an angle finder that can be mounted onto a small flat located on the connection collar of the tunable boring bar.

## 10 Chip Evacuation

- Chip packing and re-cutting can cause unwanted vibration while boring.
- Use coolant to flush out chips and to keep the damping element cool.
- Use insert geometries and cutting parameters that produce small chips.
- The boring bar can be used upside down to improve chip evacuation.

## Tuning Recommendations

- Loosen the two locking screws on the bar.
- Turn the adjusting screw clockwise until the screw stops turning freely and the mass is in the locked-down position.
- You are now ready to tune the bar.
- Turn the adjusting screw in the counter-clockwise direction in quarter turn increments to adjust.
- After the adjustment has been completed, tighten the locking screws.

## ■ Kennametal Tunable Boring Bar Center Height Alignment Procedure

The following procedure will walk the user through setting up a tunable boring bar on center without the use of flats on the shank.

### Equipment

- Digital angle finder
- Angle finder seat
- Boring bar to be used



Figure 1: Angle finder seat (left) and digital angle finder (right)

### Assembly

- Clean any dirt, chips, debris, etc. from the mounting surfaces of the digital angle finder and the corresponding surfaces of the angle finder seat.
- Assemble the digital angle finder onto the angle finder seat, making sure it is flush against the back of the angle finder seat.

### Calibration

- Clean an area on the X-axis of the lathe to create a reference surface for calibration.
- Clean any dirt, chips, debris, etc. from the magnet on the bottom of the angle finder seat.
- Place the angle finder assembly onto the X-axis of the lathe.
  - Keep the angle finder assembly parallel to the axis.
  - It is helpful to butt the assembly up against the turret housing to keep it parallel to the X-axis.
- Turn the digital angle finder on by pressing the on/off button.
- Zero the digital angle finder by pressing the zero button.

NOTE: The angle finder is now calibrated to the X-axis of the lathe and will measure angles corresponding to this axis.



Figure 2: X-axis calibration

### Boring Bar Alignment

- With the boring bar already placed in the holder and set to the correct overhang, clean any dirt, chips, debris, etc. from the small flat on the collar of the boring bar.
- Place the angle finder assembly onto the boring bar by aligning the small magnet on the bottom of the assembly with the small flat on the collar of the boring bar.
  - Be sure the angle finder assembly is perpendicular to the axis of the boring bar.
  - Be sure the angle finder assembly is oriented in the same direction it was calibrated to the X-axis of the lathe.



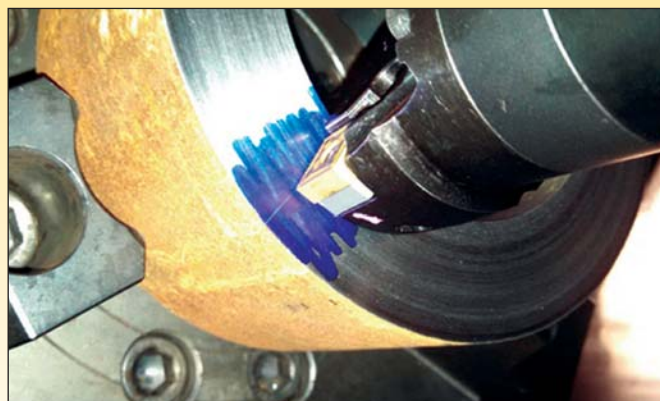
**Figure 3:** Boring bar collar flat

- Rotate the boring bar until the digital angle finder reads zero degrees.



**Figure 4:** Aligning the boring bar

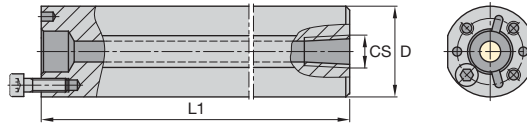
- Tighten the boring bar holder to lock the boring bar position.
  - Be sure the digital angle finder still reads zero after clamping the bar.
- The boring bar should now be on center.



**Figure 5:** Boring bar center height

### Order the Kennametal Center Height Alignment Tool Kit

The center height alignment tool kit is available to order. Use order number 6141867, or catalog number KIT-BB-AF.

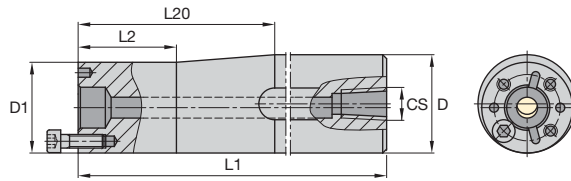


Steel shank with through coolant.  
Max 4:1 overhang ratio.



■ S-4400W

order number	catalog number	D	L1	CS	screw 3 required	screw	hex
1094941	S4416W	1.000	9.00	1/4-18 NPT	S319PKG	S322	9/64
1094942	S4420W	1.250	9.00	1/4-18 NPT	S327	S330	5/32
1094943	S4424W	1.500	10.00	1/4-18 NPT	S327	S330	5/32
1094944	S4428W	1.750	12.00	1/4-18 NPT	S337	S340	3/16
1094945	S4432W	2.000	13.00	1/4-18 NPT	S337	S340	3/16
1080487	S4440W	2.500	17.00	1/4-18 NPT	S350	S353	1/4



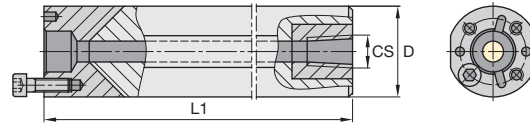
Steel shank with through coolant.  
Max 4:1 overhang ratio.



■ S-4400W48

order number	catalog number	D	L1	CS	L2	L20	D1	screw 3 required	screw	hex
1094947	S4440W48	3.000	18.00	3/8-18 NPT	3.00	6.00	2.50	S350	S353	1/4





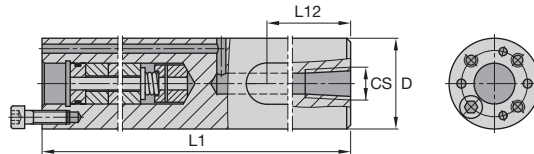
Carbide shank with through coolant.  
Max 6:1 overhang ratio.



ISO/ANSI Turning

■ C-11800W

order number	catalog number	D	L1	CS	screw		
					3 required	screw	hex
1152783	C11816W	1.000	11.00	1/4-18 NPT	S319PKG	S322	9/64
1152784	C11820W	1.250	11.00	1/4-18 NPT	S412	S415	5/32

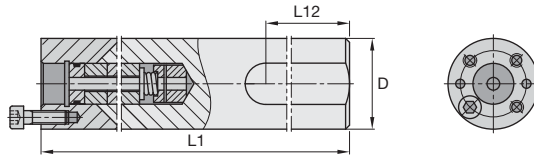


Steel shank DeVibrator with through coolant.  
Max 6:1 overhang ratio.



■ D-5400W

order number	catalog number	D	L1	CS	L12	L1 min	screw		
							3 required	screw	hex
1095839	D5420W	1.250	10.00	3/8-18 NPT	7.75	7.00	S327	S330	5/32
1095840	D5424W	1.500	12.00	3/8-18 NPT	9.25	8.00	S327	S330	5/32
1095841	D5428W	1.750	14.00	3/8-18 NPT	10.12	9.00	S337	S340	3/16
1095842	D5432W	2.000	16.00	3/8-18 NPT	12.75	10.00	S337	S340	3/16
1095844	D5440W	2.500	20.00	3/8-18 NPT	14.87	12.00	S350	S353	1/4

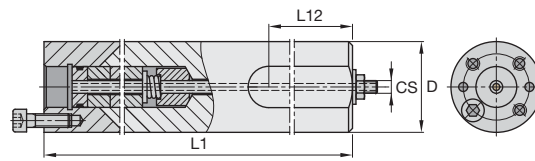


Carbide shank DeVibrator without through coolant.  
Max 8:1 overhang ratio.

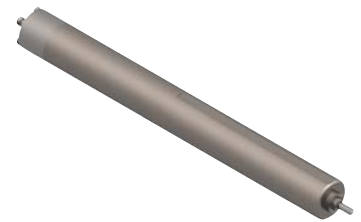


■ C-6400

order number	catalog number	D	L1	L12	L1 min	screw 3 required	screw	hex
1152790	C6420	1.250	11.00	8.75	7.00	S412	S415	5/32

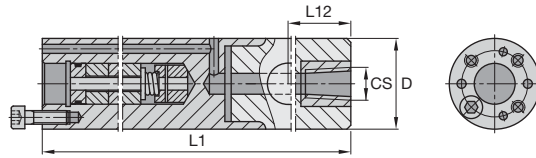


Carbide shank DeVibrator with through coolant.  
Max 8:1 overhang ratio.

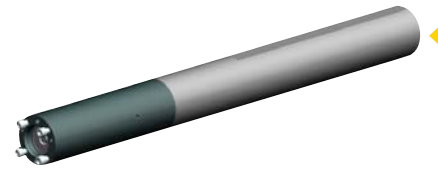


■ C-6400W

order number	catalog number	D	L1	CS	L12	L1 min	screw 3 required	screw	hex
1152777	C6420W	1.250	11.00	1/4-28 UNF	8.75	7.00	S412	S415	5/32
1152778	C6424W	1.500	14.00	1/4-28 UNF	11.25	8.00	S412	S415	5/32
1152779	C6428W	1.750	16.00	3/8-24UNF	11.38	9.00	S422	S425	3/16
1152780	C6432W	2.000	19.00	3/8-24UNF	15.75	10.00	S422	S425	3/16
1152782	C6440W	2.500	24.00	3/8-24UNF	18.00	12.00	S432	S435	1/4



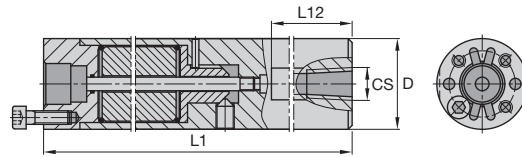
Composite shank DeVibrator with through coolant.  
Max 10:1 overhang ratio.



ISO/ANSI Turning

■ C-11900W

order number	catalog number	D	L1	CS	L12	screw 3 required	screw	hex
1152787	C11932W	2.000	20.00	3/8-18 NPT	9.75	S337	S340	3/16
1152789	C11940W	2.500	25.00	3/8-18 NPT	11.75	S350	S353	1/4



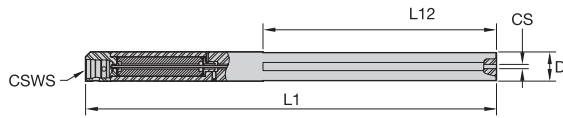
Tunable steel shank with through coolant.



■ D...TTB • Inch

order number	catalog number	D	L1	CS	L12	L1 min	screw 3 required	screw	hex
1091551	D16TTB16	1.000	15.00	1/4-18 NPT	8.00	9.09	S316	S321	9/64
1085914	D20TTB18	1.250	16.13	1/4-18 NPT	10.00	9.59	S325	S329	5/32
1082075	D24TTB21	1.500	19.38	1/4-18 NPT	12.00	11.04	S327	S330	5/32
1086694	D28TTB25	1.750	23.38	1/4-18 NPT	15.75	12.35	S337	S340	3/16
1024853	D32TTB28	2.000	26.37	1/4-18 NPT	18.50	12.27	S337	S340	3/16
1091555	D40TTB35	2.500	33.38	1/4-18 NPT	24.75	14.88	S350	S353	1/4
1309256	D48TTB42	3.000	40.37	1/4-18 NPT	24.00	20.00	S350	S353	1/4
1909159	D64TTB56	4.000	54.48	3/8-18 NPT	20.00	25.76	S350	S353	1/4

NOTE: Order number 1309256 and order number 1909159 use 2.5" diameter heads.

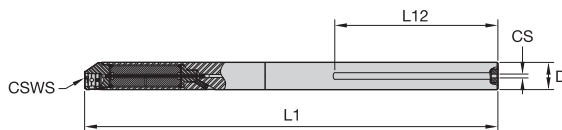


Tunable steel shank with through coolant and front end KM™ clamping unit.



■ D...TTB-KM • Inch

order number	catalog number	D	L1	CS	L12	L1 min	CSWS system size
3637915	D28TTB26KM40	1.750	24.44	1/4-18 NPT	15.75	13.50	KM40
3637916	D32TTB29KM40	2.000	27.44	1/4-18 NPT	18.50	13.38	KM40
3637917	D40TTB36KM40	2.500	34.45	1/4-18 NPT	24.75	16.00	KM40
3638033	D48TTB45KM63	3.000	42.23	1/4-18 NPT	24.00	21.70	KM63
3638034	D64TTB58KM63	4.000	56.24	3/8-18 NPT	20.00	27.62	KM63



Carbide tunable boring bar with KM™ Quick-Change connection.



■ G-TTB-KM • Inch

order number	catalog number	D	L1	CS	L12	CSWS system size
3954294	G32TTB41KM40	2.000	39.45	3/8-18 NPT	12.00	KM40
3954295	G40TTB51KM40	2.500	49.45	3/8-18 NPT	15.00	KM40
3954296	G48TTB63KM63	3.000	58.56	3/8-18 NPT	18.00	KM63