



Technology

# Duo-Lock™ Modular Systems

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## What You Need to Know

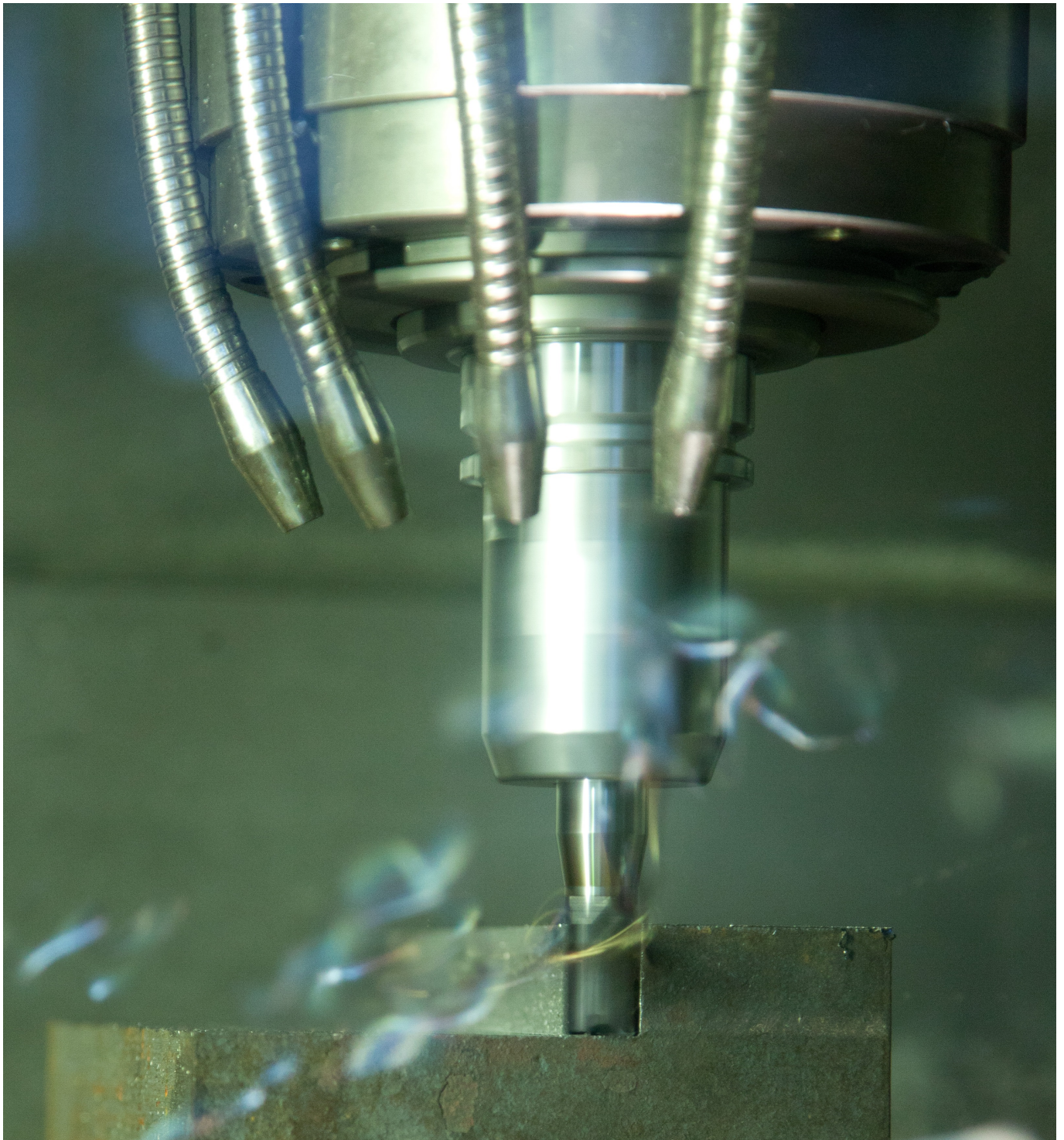
What differentiates Duo-Lock?

Why is the coupling so superior?

What are The Golden Rules?

Why is a clean coupling important?

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Duo-Lock is the latest technology from a collaboration between Haimer and Kennametal. It is the **ONLY** modular system with the performance of a solid carbide end mill.

***What differentiates Duo-Lock?***

Competitive modular milling tools are not able to perform at the level of solid carbide end mills. Duo-Lock is the **ONLY** modular system capable of 1 x D full slot milling and/or 1.5 x D side milling at up to 50% radial engagement. In comparison, known competitors can offer up to 0.7 x D length of cut for roughing, and a few have the ability for 1.2 x D for finishing. Duo-Lock standard inserts have a 1.5 x D long cutting edge for roughing and finishing.

***Why is the coupling so superior?***

Duo-Lock combines best-in-class runout accuracy and length repeatability providing maximum coupling

stability. Front support 5° cone and 1st support 10:1 cone allow axial repeatability below .0004" and radial below .0002" same insert tip in, same insert tip out. Length repeatability from insert tip to insert tip within .002". Intelligent thread and very tight cylindrical grind permits longer length of cuts up to 1.5 x D and reduces total runout at the cutting edge to below .0004". With the repeatability of Duo-Lock, accuracy of .002" can be achieved from insert tip to insert tip, across manufactured batches and across all standard geometries.

### ***What are The Golden Rules?***

- 1) Clean the coupling on both sides.
- 2) Apply recommended torque using a torque wrench.
- 3) Do not clamp on the coupling.
- 4) Use tapered shanks for slotting.

### ***Why is a clean coupling important?***

The Duo-Lock Intelligent Thread is tailored to eliminate the force peaks all regular threads have in the first groove. This functionality works perfectly if recommended torque values are applied and the thread is free of additional lubricant such as oil, anti-seize, grease etc. The Duo-Lock Intelligent Thread evenly distributes the forces across the entire length of the thread. This allows a greater than 25% torque transmission than any other competitor. Clamping on the Duo-Lock coupling has the opposite effect than lubricant on the thread. To avoid risk of tool failure during high performance applications, clean both sides of the coupling and do not clamp on the coupling.



# Which applications are ideal for Duo-Lock?

	Small DL10 and DL12	Medium DL16 and DL20	Large DL25 and DL32
Short overhang – stability criteria	<p><b>Key Benefit:</b> Throw away solution with High Performance MRR (Metal Removal Rate)</p> <p><b>Compared to competitive Solid Carbide:</b> High Performance at an attractive Price Higher tool life than General Purpose</p> <p><b>Compared to competitive Modular End Mills:</b> lower number of passes → time savings High axial repeatability → setup time reduction</p> <p><b>Recommended Product Lines:</b> HARVI 4 flute Steel Rougher RQDB 2 Flute MaxiMet for Aluminum XADA chamfering tooling</p> 	<p><b>Key Benefit:</b> Economical and reconditionable solution with High Performance tool life and MRR</p> <p><b>Compared to competitive Solid Carbide:</b> Price and flexibility in a modular offering</p> <p><b>Compared to competitive Modular End Mills:</b> Much Higher MRR → Productivity High axial repeatability → setup time reduction</p> <p><b>Recommended Product Lines:</b> HARVI Family HP Rougher RQDB and RKDF HP Finisher FMDF and FSDE 3 Flute MaxiMet for Aluminum</p> 	<p><b>Key Benefit:</b> Availability of large diameter end mills. Reconditionable solution with High Performance Tool life and MRR</p> <p><b>Compared to competitive Solid Carbide:</b> Economical off the shelf solution</p> <p><b>Compared to competitive indexable End Mills:</b> More Edges → higher MRR Longer lengths of cut-fewer passes → reduced cycle times</p> <p><b>Recommended Product Lines:</b> HARVI III for Titanium High Temp Rougher RKDF High Temp Finisher FSDE</p> 
Long overhang – Deflection criteria	<p><b>Key Benefit:</b> Economic throw away solution with High Performance MRR (Metal Removal Rate)</p> <p><b>Compared to competitive Solid Carbide:</b> High Performance → high Price advantage General Purpose → higher Tool life</p> <p><b>Compared to competitive Modular End Mills:</b> Better run out → higher tool life Fewer passes → time reduction</p> <p><b>Recommended Product Lines:</b> HARVI 4 flute square end and ball nose HP Rougher RQDB HP Finisher FMDF XADAXRDA Corner tooling</p> 	<p><b>Key Benefit:</b> Significant economic solution. Reconditionable with high MRR</p> <p><b>Compared to competitive Solid Carbide:</b> High Performance → significant price advantage General Purpose → higher Tool life</p> <p><b>Compared to competitive Modular End Mills:</b> Better run out → higher tool life Fewer passes → time reduction</p> <p><b>Recommended Product Lines:</b> HARVI 4 flute square end and ball nose HP Finisher FMDF XADAXRDA Corner tooling</p> 	<p><b>Key Benefit:</b> Significant better economic solution to carbide. Reconditionable and with better accuracy than indexable end mills</p> <p><b>Compared to competitive Solid Carbide:</b> High Performance → highest price advantage General Purpose → higher Tool life</p> <p><b>Compared to competitive indexable End Mills:</b> Reduced harmonics → better quality More Edges → higher MRR</p> <p><b>Recommended Product Lines:</b> HARVI III for Titanium High Temp Finisher FSDE</p> 

Please visit [MSCDirect.com](https://www.mscdirect.com) for the full selection of **Duo-Lock** products.

## Key Takeaways

- Duo-Lock is exciting new technology from Haimer and Kennametal.
- It is the only modular system delivering the performance of a solid carbide end mill.
- There are multiple applications where Duo-Lock can be applied.