

# KRAIS SMART PLUGGING SYSTEM MANY TUBE SIZES - ONE PLUG!

High pressure plugs for tubes  
in heat exchangers

## ⊕ THE CHALLENGE

Traditional plugging of damaged tubes in heat exchangers and condensers requires maintaining expensive, extensive inventory. For every tube outer diameter (OD), you must stock separate plugs for every possible wall thickness (BWG). This ties up capital, consumes warehouse space, and delays reaction time during critical failures.

## ⊕ THE NEW STANDARD

KRAIS changes the rules. We have developed a system based on precision reaming of the tube interior to a fixed, pre-defined dimension. Consequently, for a given tube diameter, you only need **one single plug size**, regardless of the tube's wall thickness (BWG).

## ⊕ KEY BENEFITS

**Inventory Reduction:** instead of dozens of size variations, you stock only one plug type per tube diameter.

**Instant Readiness:** eliminate lead times for non-standard plug sizes during emergencies.

**Cost Efficiency:** reduced frozen capital and minimized risk of obsolete stock.

**Reliability:** precision surface preparation ensures a seal integrity that outperforms standard methods.



The solution covers the most critical sizes  
in the power and petrochemical industries:  
3/4", 7/8", and 1" tubes

## KRAIS SMART PLUGGING SYSTEM

### MINIMILL301 SPS

A compact, pneumatic machine designed for the precision reaming of tube ends. The system removes corrosion, deposits, and pitting, calibrating the Internal Diameter (ID) to perfectly match the universal KRAIS T\_APPLE SPS plugs.

» **Durability:** Cutting heads manufactured from M2 high-speed steel or steel with 6% cobalt.

» **Reusability:** Tools can be resharpened multiple times, significantly lowering operational costs.

» **Performance Options:** Optional Oerlikon oxide coatings available for machining hard and exotic materials.



WORKING RANGE		FEED STROKE		POWER	FREE SPEED	TORQUE	
APPLICATION RANGE	LOCKING RANGE						
12,4 – 25,4 mm	12,4 – 24,0 mm	25 mm	0,787»	1,3 HP	300 RPM	43 Nm	32 ft.lbs
0,488 – 1,000"	0,488 – 0,945"						
AIR USE		BODY WIDTH		BODY HEIGHT		BODY WEIGHT	
55 cfm	1,3 m³/min	2,32"	59 mm	13,1"	335 mm	15,4 Lbs	7 kg

### T\_APPLE SPS PLUGS

Designed specifically for the KRAIS Smart Plugging System (SPS), this universal plug eliminates the need for gauge-specific sizing. By mating with the precision-reamed bore created by the MiniMill-301 SPS, a single plug size securely seals any wall thickness for a given tube outer diameter (OD)



» **Universal Compatibility:** Replaces gauge-specific plugs with one single item per Tube OD, drastically reducing inventory.

» **Torque-Controlled Installation:** Ensures consistent radial expansion without tube deformation.

» **Simplified Tooling:** Installs with a standard manual torque wrench; no hydraulic equipment required.

» **Engineered Reliability:** Delivers a secure seal capable of withstanding high thermal cycling and vibration.

### SPS PLUGS SELECTION TABLE

Please measure your tube ID and select a proper material (XX): CS for Carbon Steel, BR for Admiralty Brass, SS for Stainless Steel, CN for Cu Nickel

TUBE OD		WALL	TUBE ID		PLUG NR	TOOL NR
[INCH]	[MM]	[BWG]	[INCH]	[MM]		
3/4"	19,05	18	0,652	16,56	SPS-1690-XX	SPST-1700
7/8"	22,22	18	0,777	19,74	SPS-2010-XX	SPST-2020
1"	25,4	18	0,902	22,91	SPS-2300-XX	SPST-2330

### TOOL REAMING RANGE TABLE

Please check before order if your measured tube ID fits in tool reaming range.

TOOL NR	TUBE OD		BWG	[INCH]		[MM]		CUT LENGTH
	[INCH]	[MM]		MIN	MAX	MIN	MAX	
SPST-1700	3/4"	19,05	12-18	0,650	0,670	13,50	16-56	25 mm
SPST-2020	7/8"	22,22	12-18	0,780	0,800	16,60	19,74	25 mm
SPST-2330	1"	25,4	10-18	0,900	0,920	18,60	22,90	25 mm

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## AVAILABLE LOCKING JAWS

JAWS	RANGE [MM]		RANGE [INCH]		SPRING
	MIN	MAX	MIN	MAX	
201MM#36	12,40	14,50	0,488	0,571	DW-11
203 MM#36	13,90	16,00	0,547	0,630	DW-12,5
205 MM#36	15,90	18,00	0,626	0,709	DW-15,5
207 MM#36	16,90	19,00	0,665	0,748	
209 MM#36	18,90	21,00	0,744	0,827	
211 MM#36	19,90	22,00	0,783	0,866	
213 MM#36	20,90	23,00	0,823	0,906	
214 MM#36	21,90	24,00	0,862	0,944	



## KRAIS TUBE HOLE GAUGE K200

Choosing the correct plug size is essential for optimal performance, reliability, and safety of KRAIS tube plugs. Use the detailed sizing chart to determine the appropriate plug dimensions, ensuring compatibility and precise fitting within your specific tubing system and operational requirements

## PROPER TORQUE



A torque wrench should be used to ensure correct plug installation.

## EASY PLUG REMOVAL



A dedicated slide hammer, connected to the threaded part of the plug, allows safe extraction of the plug for tube inspection or replacement



## ORTCC - ONE REVOLUTION TUBE CUTTER VERSION C

One Revolution Tube Cutter version C is used for piercing heavy wall, carbon steel tubes for ventilation prior to plugging the leaky tubes. Delivered in two length version 6" and 12".

## SAFE PLUGGING PROCEDURE (STEP-BY-STEP)

### 1. MEASURE

Use the **KRAIS Tube Hole Gauge** to precisely determine the tube condition and dimension prior to machining.

### 2. PRESSURE RELIEF (CRITICAL)

Before plugging, the tube must be pierced to relieve internal pressure. Use the **ORTCC (One Revolution Tube Cutter type C)**. This ensures operator safety and procedural compliance.

### 3. REAM

Use the **MiniMill-301 SPS** to machine the tube interior to the required dimension.

### 4. PLUG

Install the universal **KRAIS T\_APPLE SPS** plug.

## THE STARTER KIT INCLUDES:

- 】 MiniMill-301 SPS Machine.
- 】 One selected reaming tool (for 3/4", 7/8", or 1" tubes).

Additional tools available as options.

Universal plugs (SPS series) are sized and sold separately based on specific plant requirements.



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