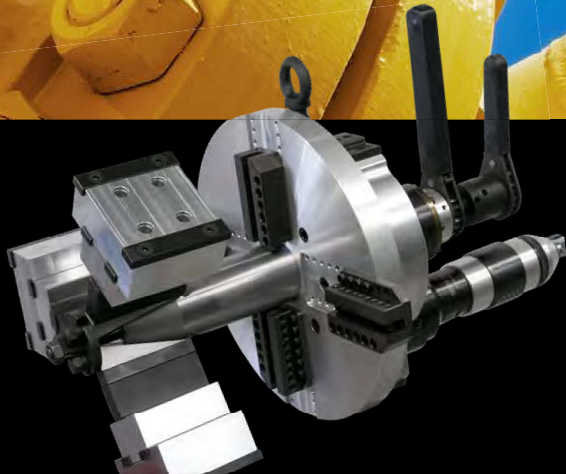
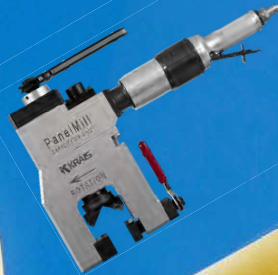
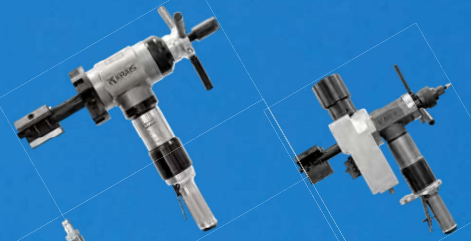
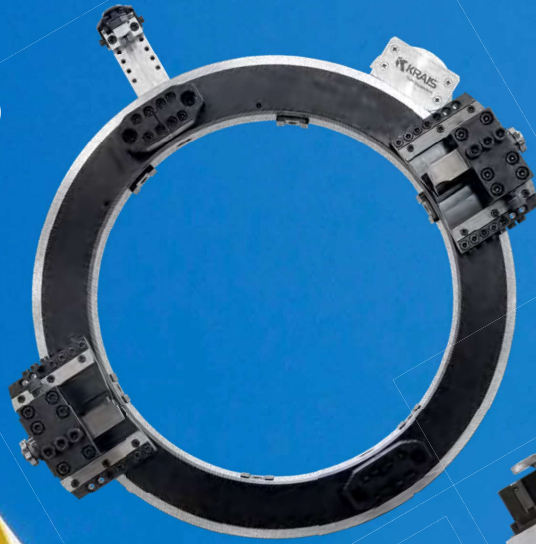




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POLAND**



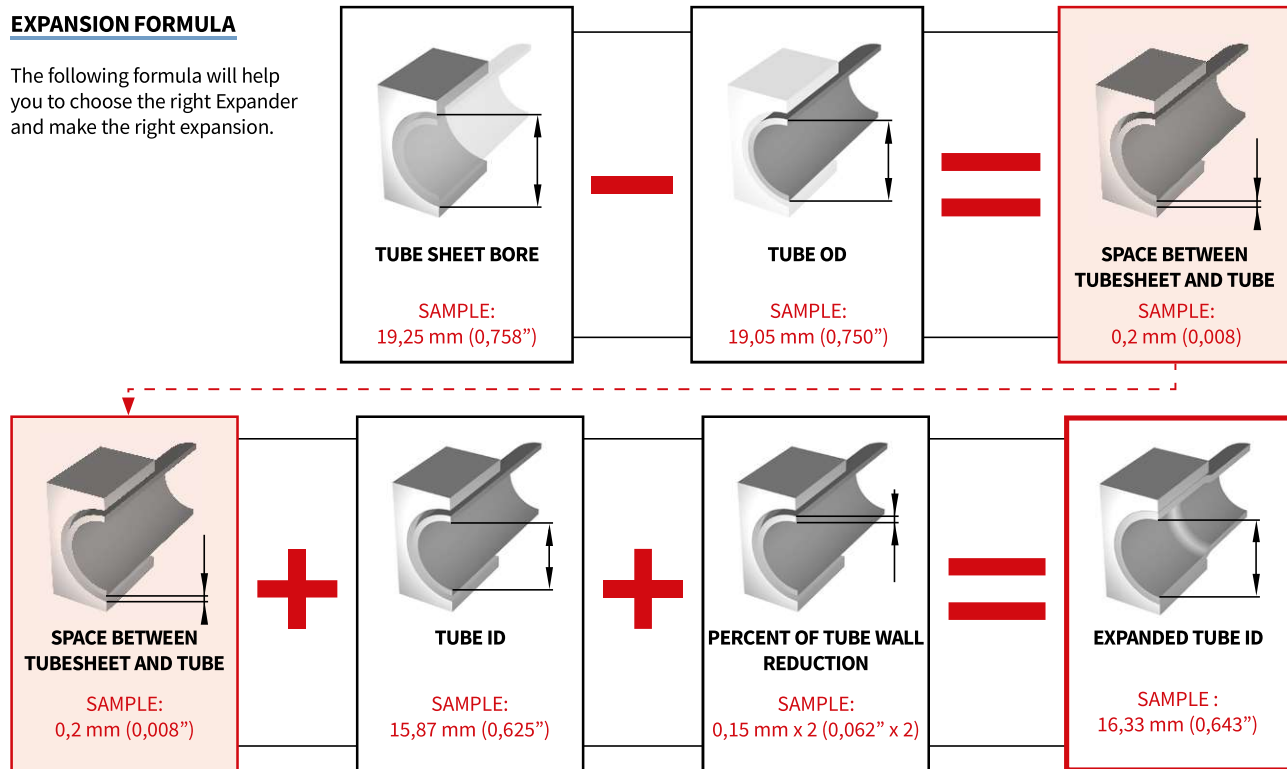
Tube & Pipe Professional Tools



Correct expansion guide

EXPANSION FORMULA

The following formula will help you to choose the right Expander and make the right expansion.



Percentage wall reduction is the most frequently used procedure to obtain the optimal mechanical joint between a Tube and Tube Sheet.

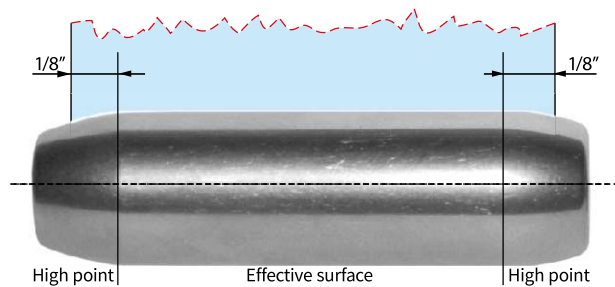
In order to calculate this reduction we must take into account the variances between the Tube OD, Tube Wall Thickness and Tube Sheet Hole Diameter. We must also consider the differing types of materials being used for both Tubes and Tube Sheets, however as a general rule, percentage wall reduction ranges between 4% - 10%.

The table illustrates the applicable percentage tube wall reductions according to the differing materials commonly used for both Tubes and Tube Sheets:

TUBE SHEET MATERIAL	TUBE MATERIAL	TUBE WALL REDUCTION
Stainless Steel	Stainless Steel	4-5%
Steel	Stainless Steel	4-5%
Steel	Steel	7%
Steel	Copper	5%
Copper	Copper	10%

For boilers tube wall thickness reduction varies between 8-16%.

ANATOMY OF ROLL



TEF – Tube End Facer



Typical application for TEF is the tube trimming of heat exchanger, condenser and chiller tubes to a uniform 1/8" (3 mm) tube projection after tube rolling. This will fit into all electric and pneumatic power tools equipped with a 1/2" Jacobs chuck. The tool is fitted with a three slot collar for precision adjustment and features a very simple mechanism for tool bit replacement. TEF is equipped with a hex shank as standard.

Work best with KDM - Kraiss Drilling Machine.



TUBE OD		TOOL NO.	PILOT RANGE	SPARE BITS	
[INCH]	[MM]			NON FERROUS OR CARBON STEEL	STAINLESS
3/8"	9,50	TEF-375	16 – 20	TEF-376	TEF-376-SS
1/2"	12,7	TEF-500	16 – 20	TEF-506	TEF-506-SS
5/8"	15,8	TEF-625	14 – 18	TEF-626	TEF-626-SS
3/4"	19,0	TEF-750	10 – 18	TEF-756	TEF-756-SS
7/8"	22,2	TEF-875	14 – 18	TEF-876	TEF-876-SS
1"	25,4	TEF-1000	10 – 18	TEF-1006	TEF-1006-SS
1-1/4"	31,7	TEF-1250	10 – 18	TEF-1256	TEF-1256-SS
1-1/2"	38,1	TEF-1500	10 – 18	TEF-1506	TEF-1506-SS
2"	50,8	TEF-2000	10 – 18	TEF-2006	TEF-2006-SS
2-1/2"	63,5	TEF-2500	10 – 18	TEF-2506	TEF-2506-SS

Tool for Serrating Tube Sheet



Portable, self-centering tool for grooving tube sheet. Unique single-piece mandrel with built-in rollers in the part that operates directly in the hole allows obtaining a perfect surface, free from burrs and flashes. The latter was formed with the previous designs during the friction of the mandrel against the walls of the hole - now, it is eliminated through the use of rollers - the mandrel rolls over the walls of the hole. Owing to the lack of friction the life of the tool has grown very significantly. As an option, the tool can be delivered with a special channel conducted inside the mandrel. Channel serving the purpose of feeding the cooling medium directly through the tool cutter, this having an enormous impact on the life of the cutter and helping in rinsing out chips during the work.

Grooving tools can be used both on portable and stationary multiradial drills. They also find their application on CNC machine tools.

JGS grooving tools are manufactured within a broad range of sizing: from 3/8" (9.52 mm) up to 4" (101.6 mm), in both imperial and metric versions. As a standard, the tools have an adjustment system for channel cutting reach, 22.2 mm to 54.0 mm (as counted from the bottom face to the internal edge of the channel being cut).

Work best with KDM - Kraiss Drilling Machine.



CUTTER BITS



Example of cutter bits, available as optional.

NOTE!

For tube sheet holes bigger up to 0,25 mm than tube OD the tailor-made mandrel should be considered. Hole bigger more than 0,25 mm may create a damage of the tool mandrel or drilling machine!

IMPERIAL VERSION TOOLS

Tool No.	Tube OD	Tool Bits (spacing)		
	[inch]	1/8 x 1/4 x 1/8"	1/8 x 3/8 x 1/8"	1/8 x 1/8 x 1/8"
JGS-375	3/8"	ST-3703-S	ST-3703	ST-3703-SPEC
JGS-500	1/2"	ST-5003-S	ST-5003	ST-5003-SPEC
JGS-625	5/8"	ST-6203-S	ST-6203	ST-6203-SPEC
JGS-750	3/4"	ST-7503-S	ST-7503	ST-7503-SPEC
JGS-875	7/8"	ST-7503-S	ST-7503	ST-7503-SPEC
JGS-1000	1"	ST-7503-S	ST-7503	ST-7503-SPEC
JGS-1250	1-1/4"	ST-7503-S	ST-7503	ST-7503-SPEC
JGS-1500	1-1/2"	ST-7503-S	ST-7503	ST-7503-SPEC
JGS-2000	2"	ST-7503-S	ST-7503	ST-7503-SPEC
JGS-2500	2-1/2"	ST-7503-S	ST-7503	ST-7503-SPEC

METRIC VERSION TOOLS

Tool No.	Tube OD	Tool Bits (spacing)		
	[mm]	3 x 6 x 3 mm	3 x 9 x 2 mm	3 x 3 x 3 mm
JGS-375-10	10,00	GS-106	GS-109	GS-103
JGS-500-12	12,00	GS-206	GS-209	GS-203
JGS-625-16	16,00	GS-306	GS-309	GS-303
JGS-750-20	20,00	GS-406	GS-409	GS-403
JGS-875-22	22,00	GS-406	GS-409	GS-403
JGS-1000-25	25,00	GS-406	GS-409	GS-403
JGS-1250-32	32,00	GS-406	GS-409	GS-403
JGS-1500-38	38,00	GS-406	GS-409	GS-403
JGS-2000-51	51,00	GS-406	GS-409	GS-403

Other sizes and bits on request.

TOOL BIT SPACING



MWR-JGS Mini Grooving Tool

First in the world, quick, powerful, yet handheld machine for serrating tube sheet in heat exchangers, boiler drums, FinFan coolers and other tubular vessels that need grooves in the tube sheet. Tool uses one cutting bit for cut any material tubes.

This unique system safely and quickly produces grooves in under 20 second for 1" tube.

Can be used as a tool for maintenance companies as well as the production tool with our dual pneumatic locking system and pneumatic cooling and lubricating module.

CUTTING RANGE		FREE SPEED		POWER		TORQUE	
Up to 101,6 mm		100 Rpm		1,3 Hp		140 Nm	
Up to 4"						105 Ft.Lbs	
AIR USE		BODY WIDTH		BODY HEIGHT		BODY WEIGHT	
55 cfm	1,3 m3/min	2,32"	59 mm	13,1"	335 mm	17,5 Lbs	8 kg



MWR-JGS ON REGULAR TUBE SHEET



On standard heat exchangers machine locks onto two shafts on the adjacent holes. The locking plate is manufactured according to the tube hole pitch to ensure precise tool alignment.

MWR-JGS REACTION PLATES



Standard locking plate has 2 reaction shafts, located from each site of the spindle. We can also supply locking plate that has locking shaft located on one side of the spindle and can be rotated through 180 degrees to accommodate partition plates, channel heads etc.

MWR-JGS E

MWR-JGS E is the electric version of the Mini Grooving Tool. The standard machine covers the same tube sizes. The electric motor, made by Makita, has a 3 stage planetary gear box manufactured by KRAIS. It has variable speed control and produces enormous torque. It is interchangeable with our pneumatic drive and can be purchased at any time.



Free Speed	115 RPM
Power	750 W
Torque	368 Nm (280 Ft.Lbs)
Feed Stroke	25 mm (1")



Full range of the grooving tools from 1/2" to 4"



The rollers over the circumference of the mandrel allow to achieve a perfect surface of the hole.

Grooving tools for MWR-JGS



TUBE SIZE	TOOL NUMBER	TOOL BIT 1/8X1/4X1/8"	TOOL BIT 3X6X3 MM	TOOL BIT SPRING	MANDREL	TURNING ROLS
1/2"	JGS-MWR-127	ST-5003-S	GS-206	ST-5011	GS-MWR-127	-
5/8"	JGS-MWR-158	ST-6203-S	GS-306	ST-6211	GS-MWR-158	-
16 mm	JGS-MWR-160	ST-6203-S	GS-306	ST-6211	GS-MWR-160	-
3/4"	JGS-MWR-190-R	ST-7503-S	GS-406	ST-7511	GS-MWR-190-R	STR-3-55
20 mm	JGS-MWR-200-R	ST-7503-S	GS-406	ST-7511	GS-MWR-200-R	STR-4-55
22 mm	JGS-MWR-220-R	ST-7503-S	GS-406	ST-7511	GS-MWR-220-R	STR-4-55
7/8"	JGS-MWR-222-R	ST-7503-S	GS-406	ST-7511	GS-MWR-222-R	STR-5-55
25 mm	JGS-MWR-250-R	ST-7503-S	GS-406	ST-7511	GS-MWR-250-R	STR-5-55
1"	JGS-MWR-254-R	ST-7503-S	GS-406	ST-7511	GS-MWR-254-R	STR-5-55
1-1/8"	JGS-MWR-285-R	ST-7503-S	GS-406	ST-7511	GS-MWR-285-R	STR-5-55
1-1/4"	JGS-MWR-317-R	ST-7503-S	GS-406	ST-7511	GS-MWR-317-R	STR-5-55
1-1/2"	JGS-MWR-381-R	ST-7503-S	GS-406	ST-7511	GS-MWR-381-R	STR-5-55
1-3/4"	JGS-MWR-444-R	ST-7503-S	GS-406	ST-7511	GS-MWR-444-R	STR-5-55
2"	JGS-MWR-508-R	ST-7503-S	GS-406	ST-7511	GS-MWR-508-R	STR-5-55
51"	JGS-MWR-510-R	ST-7503-S	GS-406	ST-7511	GS-MWR-510-R	STR-5-55
2-1/4"	JGS-MWR-751-R	ST-7503-S	GS-406	ST-7511	GS-MWR-751-R	STR-5-55
2-1/2"	JGS-MWR-635-R	ST-7503-S	GS-406	ST-7511	GS-MWR-635-R	STR-5-55
2-3/4" *	JGS-MWR-698-R	ST-7503-S	GS-406	ST-7511	GS-MWR-698-R	STR-5-55
3" *	JGS-MWR-762-R	ST-7503-S	GS-406	ST-7511	GS-MWR-762-R	STR-5-55
4" *	JGS-MWR-1002-R	ST-7503-S	GS-406	ST-7511	GS-MWR-1002-R	STR-5-55

* tool needs speed reducer

MiniDrill

MiniDrill is a unique machining platform designed to safely perform multiple machining operations on heat exchangers, boilers and similar thermal exchange equipment. Designed with operator safety in mind, this system can drill, ream, bore and even re-machine serrations in steam drums quickly and safely. With a 80 mm (3.150") travel, this tool is ideally suited for the majority of plant equipment. The system is fully torque reacted with 2 clamping arms that are independent of one another and can accommodate most pitch configurations. Once locked into the tubes, the MiniDrill is extremely stable.



AVAILABLE TOOLS WORKING WITH MINIDRILL



WALL REDUCING

Tube wall reducing head with carbide inserts.



DRILLING

Drill for machining holes in tube plugs before removing them with our special plug removal tool.



REAMMING

Safely ream tube sheets.



BORING HEAD

Boring head to machine heavy wall boiler tubes, safely and efficiently prior to collapsing through the drum.



OTHER AVAILABLE ACCESSORIES

MINIDRILL WITH FAST CLAMPING

MiniDrill with the fast pneumatic clamping system is ideal for manufacturing plants that make large amounts of work on tubes and pipes. It offers rapid tube to tube cycle time, increased productivity with little operator fatigue.



EXAMPLE TOOL APPLICATION



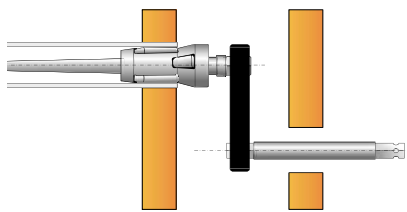
Reducing tube wall on a 6" thick tube sheet prior to punching.

Accessories

PARALLEL GEAR DRIVE

L=235 W=33 H=70 MM

For use inside the header boxes where hand holes are not in line with tube centerline.

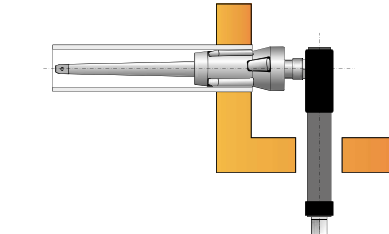


SQUARE DRIVE		TOOL
[INCH]	[MM]	
1/2" x 1/2"	12,7 x 12,7	P-Drive-127
3/4" x 3/4"	19,0 x 19,0	P-Drive-190
1" x 1"	25,4 x 25,4	P-Drive-254

RIGHT ANGLE GEAR DRIVE

L=292 W=45 H=98 MM

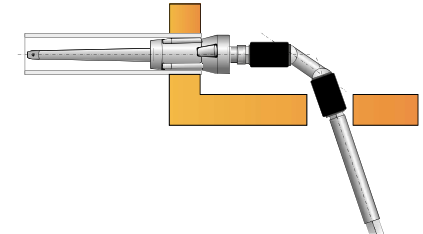
For use inside header boxes where handholds are at right angle to the tube centerline. For hand and power use.



SQUARE DRIVE		TOOL
[INCH]	[MM]	
1/2" x 1/2"	12,7 x 12,7	RA-Drive-127
3/4" x 3/4"	19 x 19	RA-Drive-190
3/4" x 1"	19 x 25,4	RA-Drive-254

DOUBLE UNIVERSAL JOINT

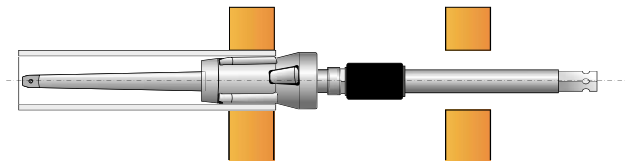
Double Universal Joint and Double Universal Joint with Quick Change Chuck.



SQUARE DRIVE	TOOL	CHUCK
3/8"	DUJ-3/8	-
	DUJ-3/8-QCC	QCC
1/2"	DUJ-1/2	-
	DUJ-1/2-QCC	QCC
3/4"	DUJ-3/4	FxF
1"	DUJ-1	FxF

EXTENSIONS

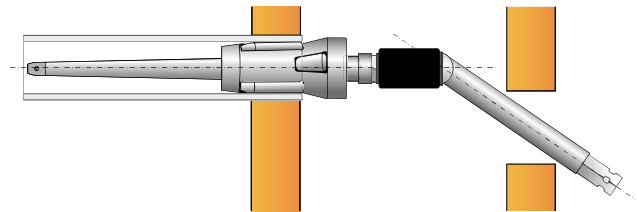
Extensions and extensions with Quick Change Chuck (QCC), single and double.



SQUARE DRIVE	TOOL	LENGTHS		QCC
		[INCH]	[MM]	
3/8"	Ext-3/8	8; 12; 24; 36	200; 300; 600; 900	-
	Ext-3/8-QCC	8; 12; 24; 36	200; 300; 600; 900	1
	Ext-3/8-2QCC	8; 12; 24; 36	200; 300; 600; 900	2
1/2"	Ext-1/2	8; 12; 24; 36	200; 300; 600; 900	-
	Ext-1/2-QCC	8; 12; 24; 36	200; 300; 600; 900	1
	Ext-1/2-2QCC	8; 12; 24; 36	200; 300; 600; 900	2
3/4"	Ext-3/4	8; 12; 24; 36	200; 300; 600; 900	-
1"	Ext-1	8; 12; 24; 36	200; 300; 600; 900	-

SINGLE UNIVERSAL JOINT

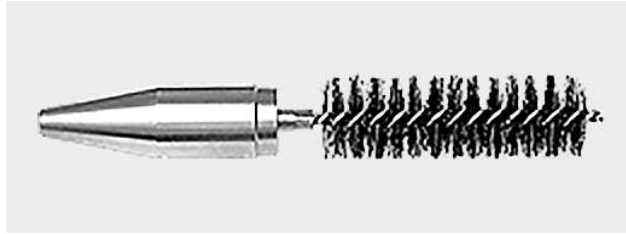
Single Universal Joint and Single Universal joint with Quick Change Chuck (QCC).



SQUARE	TOOL	AVAILABLE LENGTHS		QCC
		[INCH]	[MM]	
3/8"	SUJ-3/8	8; 12; 24; 36	200; 300; 600; 900	-
	SUJ-3/8-QCC	8; 12; 24; 36	200; 300; 600; 900	+
1/2"	SUJ-1/2	8; 12; 24; 36	200; 300; 600; 900	-
	SUJ-1/2-QCC	8; 12; 24; 36	200; 300; 600; 900	+
3/4"	SUJ-3/4	8; 12; 24	200; 300; 600	-
1"	SUJ-1	8; 12; 24	200; 300; 600	-

TUBE GUIDE

The Tube Guide consist of a steel or aluminium or plastic tapered head and an replaceable nylon brush, and it's used to guide tubes through the sheets and the tube support plates during tube bundles assembling. The nylon brush fits in the tube end, holding pilot firmly in place.



TUBE OD		TUBE GAUGE	TUBE GUIDE
[INCH]	[MM]		
1/2	12,7	16-18	TG-1
		19-20	TG-2
		21-23	TG-3
5/8	15,88	12-13	TG-4
		14-16	TG-5
		17-20	TG-6
		22-24	TG-7
		10-12	TG-8
3/4	19,05	13-16	TG-9
		17-20	TG-10
		21-22	TG-11
		10-12	TG-12
7/8	22,2	13-16	TG-13
		17-20	TG-14
		22-24	TG-15
1	25,4	8-9	TG-16
		10-12	TG-17
		13-16	TG-18
		17-20	TG-19
1-1/4	31,7	15.	TG-21
		16-	TG-22
1-1/2	38,1	15.	TG-23
		16-	TG-24

URH-1925 UNIVERSAL RATCHET HANDLE

Manual drive for tube expanders. One side 3/4" square drive, other side 1" square drive. Allows rotation transmitted by a ratched mechanism.



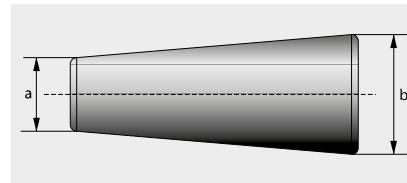
MOTOR COUPLING

Motor coupling and Motor coupling with Quick Change Chuck (QCC)



SQUARE	TOOL	LENGTH	QCC
3/8	MT-2x3/8"	2"	
	MT-2x3/8"-QCC	2"	YES
1/2	MT-2x1/2	2"	
	MT-2x1/2"-QCC	2"	YES
3/8	MT-2x3/8"	2"	
1/2	MT-3x1/2"	3"	
3/4	MT-3x3/4"	3"	
1	MT-4x1"	4"	

ONE PIECE TUBE PLUGS



TUBE OD		TUBE GAUGE	A		B		TUBE PLUG
[INCH]	[MM]		[INCH]	[MM]	[INCH]	[MM]	
3/8	9,5	15-22	0,176	4,47	0,388	9,86	TP-1-***
		11-14	0,176	4,48	0,388	9,87	TP-1-***
1/2	12,7	15-22	0,301	7,65	0,513	13,00	TP-2-***
		11-14	0,301	7,66	0,513	13,01	TP-2-***
5/8	15,8	15-22	0,426	10,82	0,638	16,20	TP-3-***
		11-14	0,426	10,83	0,638	16,21	TP-3-***
3/4	19,05	15-22	0,551	14,00	0,763	19,38	TP-4-***
		11-14	0,551	14,01	0,763	19,39	TP-4-***
7/8	22,22	15-22	0,676	17,17	0,888	22,56	TP-5-***
		11-14	0,676	17,18	0,888	22,57	TP-5-***
1	25,4	15-22	0,801	20,35	1,013	25,73	TP-6-***
		11-14	0,801	20,36	1,013	25,74	TP-6-***
1-1/8	28,6	15-22	0,926	23,52	1,138	28,9	TP-7-***
		11-14	0,926	23,53	1,138	28,10	TP-7-***
1-1/4	31,7	15-22	1,015	25,78	1,263	32,08	TP-8-***
		11-14	1,015	25,79	1,263	32,09	TP-8-***
1-3/8	34,9	15-22	1,176	29,87	1,388	35,87	TP-9-***
		11-14	1,176	29,88	1,388	35,88	TP-9-***
1-1/2	38,1	15-22	1,301	32,66	1,513	38,93	TP-10-***

** Specify material: AL for Aluminium; S for Steel; S for Stainless Steel; B for Brass; M for Monel

Vacuum Leak Tester KVLD-3000

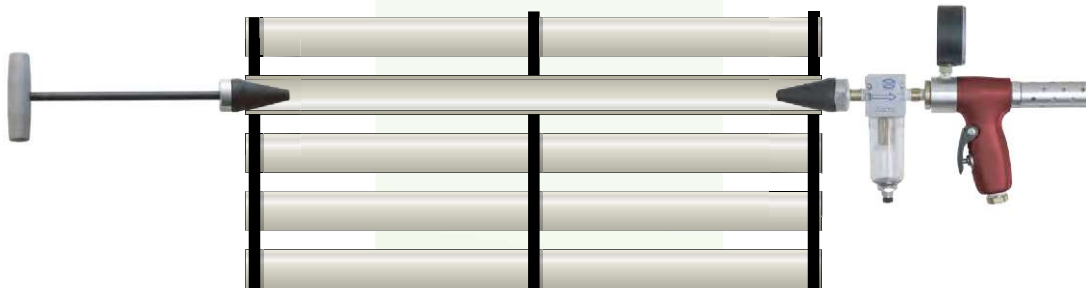
The vacuum leak tester KVLD-3000 is a simple, precise method of testing tubes in boilers, condensers, and heat exchangers. It is the fastest, most accurate means of locating leaky tubes for plugging or replacement.

FEATURES

- › Only one tool necessary for testing multiple tube sizes.
- › Built-in easy to read vacuum gauge.
- › Muffled exhaust for quiet operation.
- › Lightweight, easy to use.

SPECIFICATIONS

- › Cover wide range of tubes with one unit (tube sizes: 1/4" (6,3) to 3" (76,2 mm)).
- › Requires 90 PSI (6,2 bar) compressed air.
- › Air consumption: 26 C.F.M. (720 l/min).
- › Carrying case measures: 16" x 12" x 4" (410 x 300 x 85 mm).
- › Tool weight: 4,4 lbs (1,2 kg).
- › Approximate shipping weight: 6,6 lbs (3,0 kg).

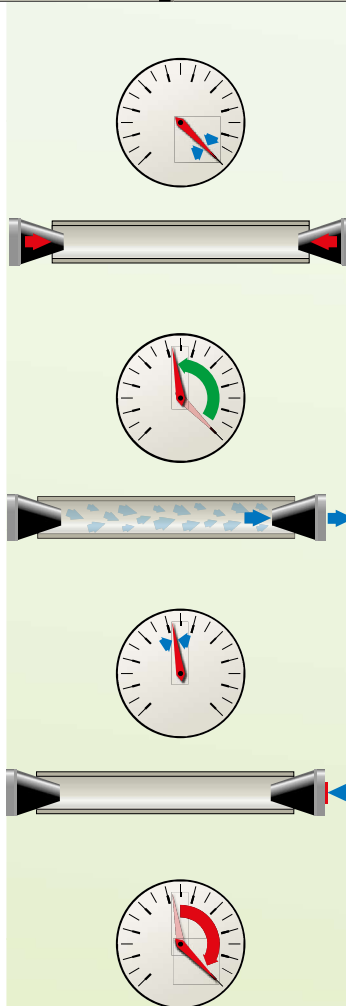


NOZZLES AVAILABLE

PART NUMBER	TUBE OD
K-1002	1/4" (6,3 mm) - 3/4" (19 mm)
K-1003	5/8" (15,9 mm) - 1 1/4" (31,7 mm)
K-1004	1 1/8" (28,6 mm) - 2" (50,8 mm)
K-1005	1 7/8" (47,6 mm) - 3" (76,2 mm)

OPERATING INSTRUCTIONS

1. Seal far end of tube to be tested with "t" handle type tube plug or optional snap type tube plug.
2. Place nozzle of tester into near end of tube.
3. Squeeze trigger of test unit until gauge reaches desired reading.
4. Release trigger and observe gauge.
5. A steady reading on gauge indicates no leaks.
6. Move to next tube and repeat.



Testing pumps

All testing pumps are delivered „ready for use” and equipped with:

- 】 tank (Except PEM 30),
- 】 pressure gauge,
- 】 drain valve,
- 】 flexible hose. 16” long. (3” for PEM 30 / 6” for PEM 40)

The seals used are made for usage with water, fluid oil or gas-oil.
Please call us any other liquids.

PEM HAND OPERATED PUMP



LE-PTP ELECTRIC PUMP



PTP1201 PNEUMATIC PUMP



MODEL	DRIVEN	SERVICE PRESSURE		DIAMETER	STROKE	VOLUME PER STROKE		TANK CAPACITY		WEIGHT	
		BAR	PSI	MM	MM	CM ³	IN ³	LITRES	U.S.G	KG	LBS
PEM 30	Hand	30	400	14	400	61	3,7	-	-	4,2	9,3
PEM 40		60	850	20	34	10	0,6	14	3,7	6,3	14
PEM 50		50	700	30	40	28	1,7	45	11,9	13	29
PEM 100		100	1400	22	40	15	0,9	45	11,9	13	29
PEM 200		200	2800	50x16	40	78x8	48x0,5	45	11,9	18	40
PEM 600		600	8500	32x12	40	32x4	2x0,25	60	15,9	35	77,8
PEM 1000		1000	14000	32x8	40	32x2	2x0,12	60	15,9	35	77,8
LE-PTP 180	ELECTIRC	180	2548	-	-	-	-	100	26,45	60	132,3
PTP 1201	PNEUMATIC	720*	10200*	-	-	-	-	10	2,64	21	46,3

* depends on air pressure