

# "Wart" MILLHOG®

Right Angle I.D. Clamping End Prep Tool  
 .75" I.D. to 4.5" O.D.  
 19.1 mm I.D. to 114.3 mm O.D.

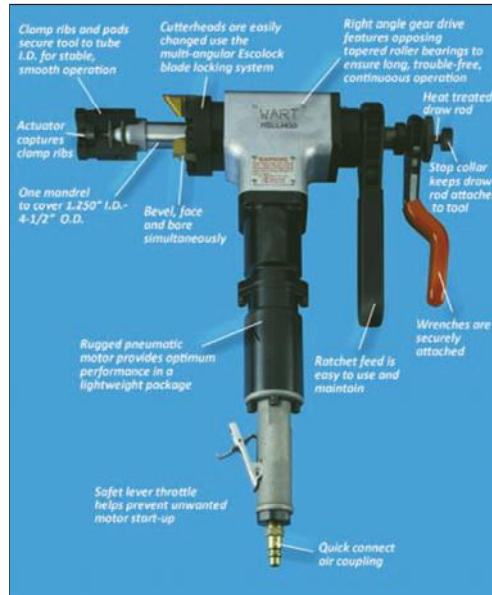
Built for boilermakers, handles hard alloys, and fits between tubes for single tube removal

## Key Features

- A heavy duty ratchet wrench and knurled knob allows easy clamping and is perfect for limited access areas
- Mounts rigidly to produce a clean, continuous chip
- Requires no cutting lubricant
- Simultaneously bevels, faces, and bores
- Lightweight and requires no special training
- Efficient chatter-free cutter blade locking design
- Torque-free operation prevents operator fatigue
- Low maintenance, compact, air-powered tool

## Engineered for High Volume Use

The Esco "Wart" MILLHOG® is a right angle, I.D. clamping end prep tool that features an efficient, low-maintenance design incorporating dual opposed tapered roller bearings. This makes the "Wart" rigid, stable and extremely durable. Built for boilermakers, there are no bushings to wear out and the sealed mandrel prevents debris from getting inside the tool, allowing it to be used in any orientation. What's more, the compact design requires a minimum of 2-5/8" to fit between tubes.

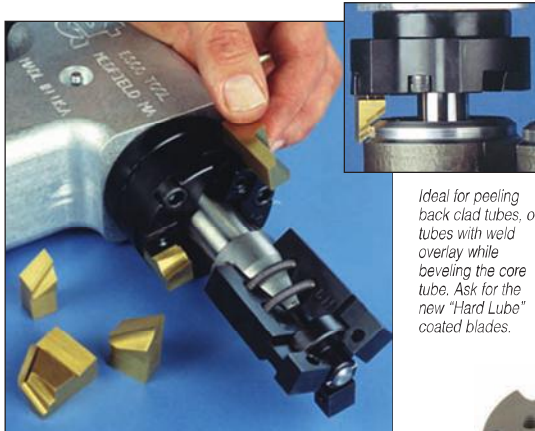


The "Wart" MILLHOG® is also available with a number of accessories to accommodate more specific end prep application needs.

## Interchangeable Clamp and Rib Pads

Simple to operate, the "Wart" MILLHOG® uses one mandrel for the vast majority of jobs (see clamp rib and clamp pad selector chart). All you have to do is measure the tube I.D., select the correct ribs and/or pads and install them on the mandrel. Because they self-align, that's all there is to it.

Now insert the mandrel into the tube I.D., expand the clamp ribs and/or pads and perform your end preps in seconds.



Ideal for peeling back clad tubes, or tubes with weld overlay while beveling the core tube. Ask for the new "Hard Lube" coated blades.



Ideal for limited access areas, the "Wart" MILLHOG® requires a minimum width of 2-5/8" clearance to fit between tubes, and easily clamps into place with the Knurled Knob and Heavy Duty Ratchet.

One mandrel covers 1.250" I.D. to 4.500" O.D. and titanium nitride coated cutter blades fit securely into the multi-angular Escolock blade locking system.



Membrane removal heads and Overlay removal heads efficiently remove material from between boiler tubes.

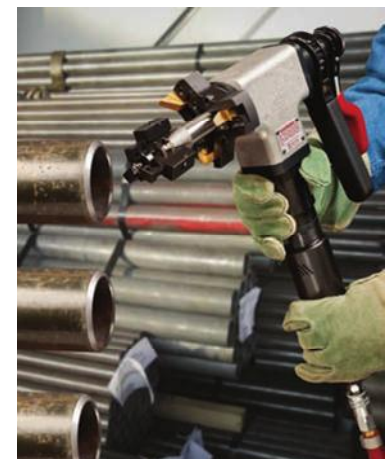


Base Heads attach to the tools drive shaft.



Membrane and Overlay Heads attach to the Base Head.

Membrane and Overlay Heads look very similar. Overlay heads have a slightly smaller circumference. Base Heads can be fitted with a Bevel Blade.



Bevel, face and bore simultaneously up to 4.5" (114.3mm) o.d.

# "Wart" MILLHOG®

## Specialty End Prep Tools



Like the Air Powered "Wart", the "Electric Wart" is ideal for close quarters.



Already own a "Wart", no problem, the electric motor is interchangeable, takes only minutes to switch, and requires no special tools.



### Wart Electric Kit includes:

Gear Head, Electric Motor - .932kw, Draw Rod Assembly, 1.250in Mandrel, Hose with couplings, dirt stopper and oiler, and Carrying Case.

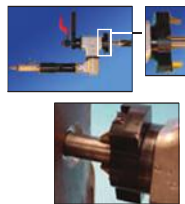
### "Electric Wart" MILLHOG®

Interchangeable with the pneumatic motor, the "Wart" gear head can easily convert from Air Driven to Electrically Powered in a matter of minutes, and requires no special tools or training. Easily turned "on" and "off", the powerful variable speed, 1400 watt double insulated motor and the ESCO proprietary speed reduction spider combine to develop maximum cutting force at the blade, that produces a thick chip, and prevents work hardening without using a cutting lubricant.

### "Z Wart" MILLHOG® End Prep Tool

The "Z Wart" MILLHOG® is a powerful narrow body specialty end prep tool for applications when tool width is critical and torque needs to be maximized. A slender 2-5/8" wide, the "Z Wart" MILLHOG® adds an additional right angle drive into the conventional "Wart" MILLHOG® drive train that reduces the RPM by half, and doubles the torque at the cutting blade.

The low RPM and high torque of the "Z Wart" MILLHOG® make it well suited for end prep applications that include tube stub removal and weld overlay. Please consult factory for application specifications, and ordering information.



The "Z Wart" features a cutter-head that holds the cutting blades 180 degrees apart, and distributes the cutting force evenly on the cutting surface. This significantly reduces chatter, which helps to prolong blade life.

The "Z Wart's" low RPM and high torque make it well suited for applications that include tube stub removal.

### "Contour Wart" MILLHOG®

The "Contour Wart" MILLHOG®, or "fish-mouth", is a specialty end prep tool for profiling tube ends so they sit evenly on the radius of a header and allows for full penetration welds. The profile shape of the end prep is specific to the application, and is ideal when a large number of end preps, of consistent size need to be profiled. For ordering information, and application specifications, please consult the factory.



Fast, perfectly contoured end preps are easily accomplished and requires no further rework, prior to end prepping... every time.

The Contour "Wart" MILLHOG® produces flawless end preps on tube ends when accurate fit-up is needed to weld tubes to a header.

### Wart Clamp Rib Selector and corresponding spares

Mandrel, Draw Rod, Actuator, Retention Band and Springs

Clamp Set	I.D. Range				Mandrel		Draw Rod		Actuator		Retention	
	in	mm	Part #	Size	Part #	Size	Part #	Roll Pin	Part #	Roll Pin	Band	Spring
G-03A	.750	.905	19.1	22.9	H-241	.750	H-247	G-17	G-15	G-14F		
G-04	.875	1.030	22.3	26.1	H-241	.750	H-247	G-17	G-15		G-14	
G-05	1.000	1.155	25.4	29.3	H-241	.750	H-247	G-17	G-15		G-14	
G-06	1.125	1.280	28.6	32.5	H-241	.750	H-247	G-17	G-15		G-14	
G-07	1.250	1.405	31.8	35.6	H-241	.750	H-247	G-17	G-15		G-14	
G-08	1.375	1.530	35.0	38.8	H-241	.750	H-247	G-17	G-15		G-14	
G-09	1.500	1.655	38.1	42.0	H-241	.750	H-247	G-17	G-15		G-14	
G-10	1.625	1.780	41.3	45.2	H-241	.750	H-247	G-17	G-15		G-14	
G-11	1.750	1.905	44.5	48.3	H-241	.750	H-247	G-17	G-15		G-14	
G-12	1.875	2.030	47.7	51.5	H-241	.750	H-247	G-17	G-15		G-14	
G-13	2.000	2.155	51.0	54.7	H-241	.750	H-247	G-17	G-15		G-14	
H-00	1.000	1.300	25.4	33.00	H-220	1.00	H-51	H-12A	H-11		H-14A	
H-01	1.375	1.600	34.9	40.6	H-21	1.25	H-51	H-12	H-11		H-14B	
H-02	1.525	1.925	28.8	48.9	H-21	1.25	H-51	H-12	H-11		H-14B	
H-03	1.850	2.250	47.0	57.2	H-21	1.25	H-51	H-12	H-11		H-14B	
H-04	2.175	2.575	55.3	65.4	H-21	1.25	H-51	H-12	H-11		H-14B	
H-02 & H-05	2.500	2.900	63.5	73.7	H-21	1.25	H-51	H-12	H-11		H-14B	
H-03 & H-05	2.825	3.225	71.8	81.9	H-21	1.25	H-51	H-12	H-11		H-14B	
H-04 & H-05	3.150	3.550	80.0	90.2	H-21	1.25	H-51	H-12	H-11		H-14B	
H-02 & H-08	3.475	3.875	88.3	98.4	H-21	1.25	H-51	H-12	H-11		H-14B	
H-03 & H-08	3.800	4.200	96.6	106.6	H-21	1.25	H-51	H-12	H-11		H-14B	
H-04 & H-08	4.125	4.525	104.8	114.9	H-21	1.25	H-51	H-12	H-11		H-14B	

### Wart Cutterheads

Cutterhead		Mandrel		Blade Lock		Blade Screw	
Part #	Size	Part #	Size	Part #	Per Head	Part #	Per Lock
H-242	2.625	H-241	.750	H-22	3	H-23	1
CH-20	2.625	H-220 or H-21	1.00 or 1.250	H-22B	3	H-23	1
CH-21	3.00	H-21	1.250	H-22C	3	H-23	1
CH-22	3.50	H-21	1.250	H-22A	6	H-23	1
CH-23	4.00	H-21	1.250	H-22A	3	H-23	1
				H-22C	3	H-23	1
CH-24	4.50	H-21	1.250	H-22C	6	H-23	1

### Specifications

"Wart" and "Electric Wart" MILLHOG®	
Working Range:	3/4" (19.1 mm) I.D. to 4-1/2" (114.3 mm) O.D.
Motor, pneumatic/electric	1-1/4 h.p. (.932 kw)
Power Requirements	120 volt 12.2 amp 50/60 hz 1400 watt 230 volt 6.9 amp 50/60hz 1450 watt
Air Pressure	90 psi.(6.2 bar)
Air Volume	40 cfm (1133 l/min.)
Speed	180 RPM (electric speed variable up to 180 RPM)
Minimum Clearance	2-5/8" (66.68 mm)
Head Length	14-1/2" (368.3 mm)
Working Weight	19 lbs. (8.7 kg)
Shipping Weight	55 lbs. (25 kg) 63 lbs (28.6kg) pneumatic - approx. 55 lbs (25kg) electric - approx.
Shipping Dimensions	24" x 20" x 7" (610 mm x 508 mm x 178 mm)
Manufacturer reserves the right to change specifications without notice	

### Membrane Removal Heads

Membrane Head Size	Part #	Base Head Part#	Inserts Part #	Qty
2	MO-110	HB-110	MRB-8	6
2.125	MO-111	HB-110	MRB-8	6
2.25	MO-112	HB-110	MRB-8	6
2.5	MO-113	HB-110 or HB-114	MRB-8	7
2.75	MO-114	HB-114	MRB-8	7
3	MO-115	HB-114	MRB-8	8

### Overlay & Membrane Removal Heads

Overlay Head Size	Part #	Base Head Part#	Inserts Part #	Qty
2	MO-210	HB-110	MRB-8	6
2.125	MO-211	HB-110	MRB-8	6
2.25	MO-212	HB-110	MRB-8	6
2.5	MO-213	HB-110 or HB-114	MRB-8	7
2.75	MO-214	HB-114	MRB-8	7
3	MO-215	HB-114	MRB-8	8