Tube-Mac Flaring Machine Information Package
TFM – 01, TFM-01-LS

The purpose of the TUBE-MAC® Industries TFM-01 and TFM-01-LS flaring machine is to produce a 37° flared pipe end in either cold drawn carbon steel or stainless steel pipe/tube. The TFM 01 flaring machine will produce a quality surface finish to meet the TUBE-MAC® flare flange/cone insert. The TFM-01 is the standard design which has the greatest range of sizes for NPS, Metric and OD Tube. The new designed TFM-01-LS has been developed for heavier walled Pipe and Tube and is suggested for sizes such as 2" Sch.160 and 4" Sch.80 Pipe or 60x8mm and 115x7mm metric tube.

Capacity:

TFM-01 or TFM-01-220
NPS from ½" thru 3" Sch. 80, 3-1/2" and 4" Sch. 40
Metric from 12mm thru 115mm x 7mm wall
O.D. Tubes from ½" thru to 2"

TFM-01-LS or TFM-01-LS-220(Low Speed)
NPS from 1" Sch. 80 thru to 4" Sch.80
Metric from 38mmx 5mm thru to 115mmx 7mm

Voltage:

TFM-01	120/1Ø/60hz
TFM-01-220	220/1Ø/50hz

Weight: 920 lbs./ 417 kg

Standard Construction (See Figures #1, 2 and 3 below):

- ✓ Hard rubber rotating Castors located at each bottom corner and a maximum width of 30" (760mm) allow for easy maneuvering of unit anywhere in a facility. (Fig.7)
- ✓ A 30ft (9m) power cord will reach any electrical outlet or generator (Fig.2)

- ✓ Oil drain below flaring pin allows for oil to drain away from flaring area to a collection bottle located underneath in the storage area of the machine (Fig 3)
- ✓ Each unit comes with a pad lock to which locks the lid and front door shut to prevent damage or theft of tooling when not in use (Fig 5)
- ✓ Four (4) bright yellow lifting eyelets at each corner of the unit allow for easy lifting with a crane or forklift to any destination such as on board a ship or above/below ground working areas (Fig 6)
- ✓ Bottom of unit allows for storage of material or tooling that can be kept clean and safe behind the locked front door (Fig 3)
- ✓ Flaring Die and Pin shelf located beside operating switch allows for easy access and storage of flaring machine accessories. (Fig 1)
- ✓ Lid is easy to open due to a gas cylinder that helps with opening
- ✓ Handle of pump rotates 180° to allow operator to use either left or right hand while operating unit (Fig 1)
- ✓ One piece barrel and rigid framework makes for a durable and long lasting machine designed for a large range of flaring tube/pipe sizes (Fig 1)
- ✓ Training on the use of the TFM-01 machine is simply and easy when Tube-Mac qualified personnel train the operators on proper operating procedures and maintenance of the machine

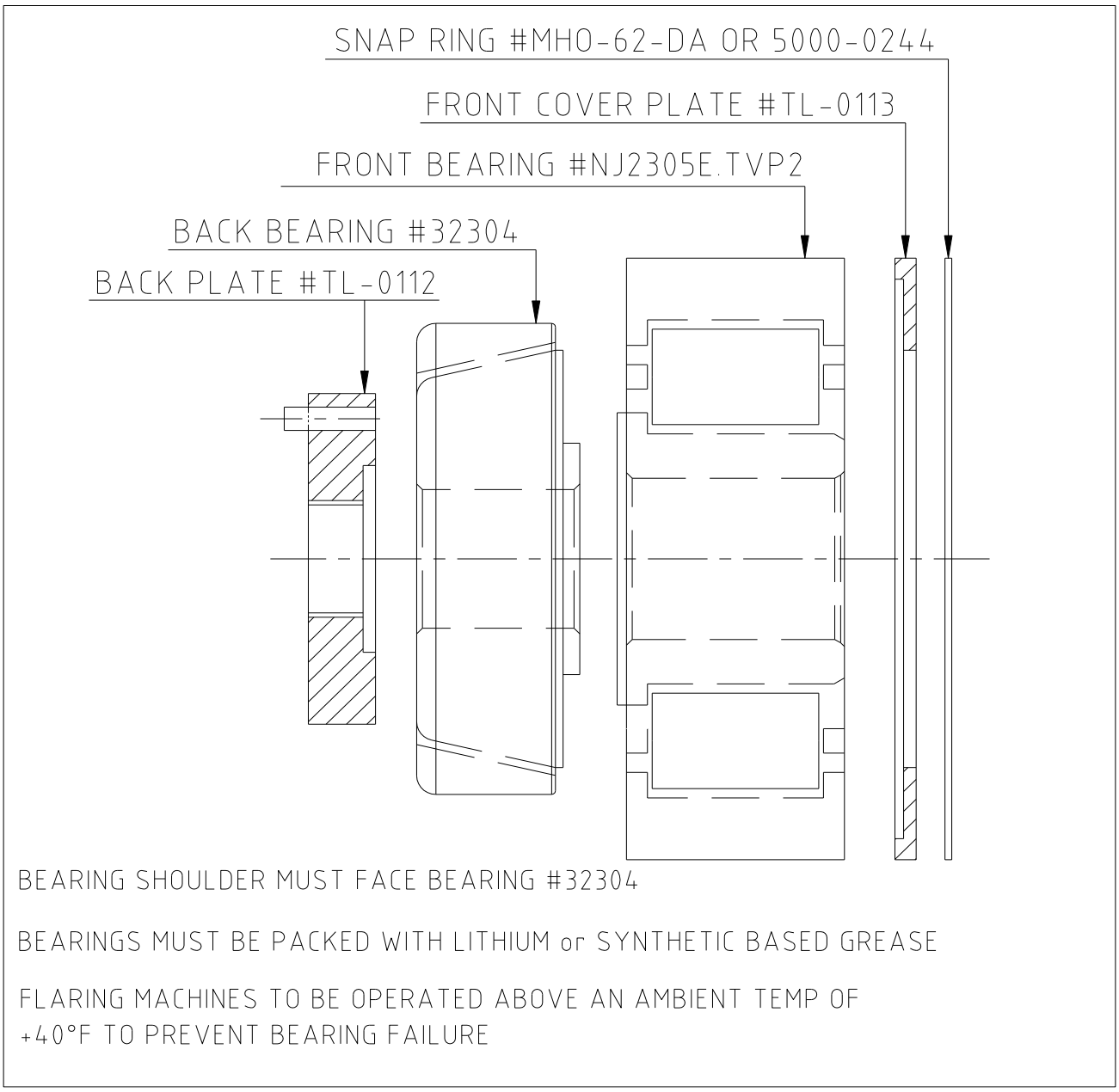
Maintenance:

The TFM 01 flaring machine needs very little maintenance, as long as the machine is kept dry and clean. All bearings are of a standard type. Hydraulic fluid (Dexron III) must be checked occasionally and topped up as required.
It is advised the flaring head be kept in the forward position when the machine is not in use, with the front end of piston flush with the front of cylinder. This is to protect the hydraulic cylinder against rust and dust.

When replacing the cone bearings they can be removed easily with the threaded “back plate” (Part# TL-0112) which is behind the cone bearings, using slide hammer. When replacing the bearings it is imperative to always replace both bearings and pack each with high pressure grease. Using the provided diagram (located on each machine), position the bearings and back plate in the proper arrangement in the shaft support area. See Figure “A” for bearing alignment and configuration when changing out damaged shaft support bearings.

Figure “A”

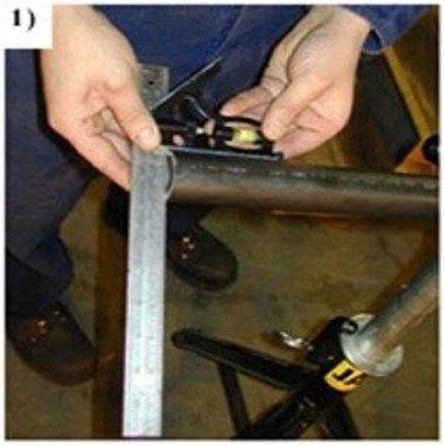
Shaft Support (Cone) Bearings – Configuration for Bearing Change



←Back of Machine (Cylinder End) **(See Fig.1)** **Front of Machine (Flaring End) →**

PIPE FLARING

1)



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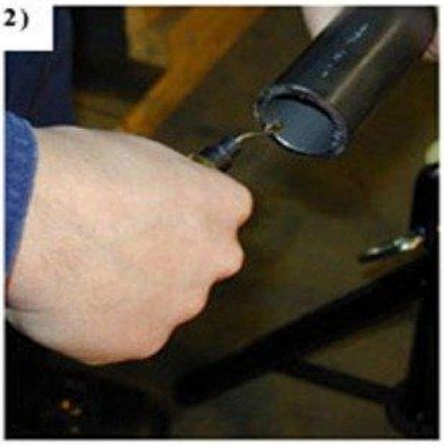

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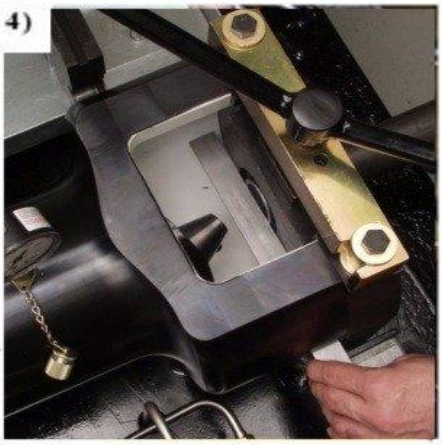


5)

6)

7)

8)

9)

TFM-01 / TMF-01-LS FLARING PROCEDURE

- PREPARATION -
1. Cut pipe to length with a bandsaw, or abrasive saw. Check the cut is square.
2. Deburr the OD with a file, the ID with an internal deburring tool. File the end of the pipe smooth, removing saw marks.
3. Clean the pipe, removing any cuttings/filings. Pull a clean lint free rag through the pipe to remove any dust/dirt.
- FLARING -
4. Select the flaring cone for the pipe size, clean, and insert into the flaring head. See “Consumable Parts List” below for proper flare cone selection.
5. Select the die set for the OD size of pipe, and install one half into the die holder. Install the flange onto the pipe, place the pipe end into the lower die half, and support the other end of the pipe in a pipe stand. Place the upper die half into the die holder onto the end of the pipe. Hold the straight edge provided across the die surface, bringing the pipe end flush to the straight edge. Tighten the die clamp firmly.
6. Using the manual pump, advance the flaring head until the cone just comes into contact with the pipe. Lubricate the flaring cone with 90 weight gear oil, then energize the e-motor to begin the flaring head rotating.
7. Advance the flaring cone with short strokes of the manual pump until the desired flaring pressure is reached, maintain the pressure with short strokes of the manual pump as the flare is ironed until the there is no further pressure decay. The back of the flare should be contacting the die, and the flare is now complete. Shift the manual valve to release pressure from the flaring head as soon as the flare is complete. Continuing to iron the flare too long will cause a ridge to form in the bore of the pipe. Reference the chart below.
8. Retract the flaring head and remove the pipe from the dies. Wipe the flare clean and inspect. The surface should be smooth, polished, and free of cracks.
9. Remove any burrs from the dies on the outside of the pipe with a file. Set the flare flange cone into the pipe with a soft face hammer. There should be a gap of 1/16 – 1/8” (1-3mm) between the end of the flare and the shoulder of the cone, and the flange should slide freely over the flare.
Notes: -It is advisable when flaring large quantities in a short period of time or heavy walled pipe to change out the flaring pin on each flare to prevent both the internal bearings and cones from overheating and premature failure -Pipe sizes 3” (90mm), 3-1/2” (100MM) and 4” (115MM) require faring twice, rotating the pipe 90° in the dies between flare operations to eliminate any tolerance issues on the flare -For flaring Schedule 160 Pipe or Heavy wall metric tube, see below for further instructions

Flaring Procedure for Schedule 160 Pipe (1 ½" thru 2 ½") and Heavy Wall Metric Tube (50mm thru 75mm)

Use a good quality high temperature grease to pack the bearings. Repack the bearings every 6 flares. Will need at least a quantity of (4) TL-0012A flare pins (extra pins are required for rotating between each one to allow to cool)

1. Start with the pipe end .125" (3mm) - .150" (4mm) proud of the dies.
2. Clamp the pipe tightly in the dies. Mark the pipe at the back of the dies to see if there is any slippage while flaring.
3. Advance the TL-0012A flare pin/head and begin the flare @ 60bar.
4. Continue to advance the flare pin as long as the pressure continues to decay, increasing pressure in 10bar steps as pressure decay slows. Increase to maximum 110bar over maximum 1½ minutes total flaring time.
5. Retract flare pin/head, change pin (to allow cooling) and rotate pipe 90° in dies.
6. Flare starting @ 100bar, increasing to 110bar for maximum ½ minute total flaring time.
7. Flare is now complete. File any burrs/ridges on the OD of the pipe from the dies.
8. Flange should slide over the flare, with minimal clearance between OD of flare and ID of flange.

FLARING PRESSURE and DURATION			
PIPE SIZE		**Pressure****	**Duration****
1/2"	**20MM**	**30 - 50 bar**	**3 - 6 seconds**
3/4"	**25MM**	**40 - 50 bar**	**5 -10 seconds**
1"	**30MM**	**40 - 60 bar**	**5 -10 seconds**
1-1/4"	**38MM**	**50 - 70 bar**	**5 -10 seconds**
1-1/2"	**50MM**	**60 - 80 bar**	**7 -20 seconds**
2"	**60MM**	**70 - 80 bar**	**8 -20 seconds**
2-1/2"	**75MM**	**70 - 100 bar**	**15 - 60 seconds**
3"	**90MM**	**80 - 110 bar**	**30 - 120 seconds***
3-1/2"	**100MM**	**80 - 110 bar**	**30 - 120 seconds***
4"	**115MM**	**80 - 110 bar**	**30 - 120 seconds***

****Pressures and durations will vary with wall thickness and material strength****

Pipe sizes 3" (90mm), 3-1/2" (100MM) and 4" (115MM) require faring twice, rotating the pipe 90° in the dies between flare operations to eliminate any tolerance issues on the flare

Consumable Parts List

Pipe Flaring Pins

Item #	Part Number	Description
1	TL-0011A	1/2" to 1" Pipe 12mm to 30mm 1/2"to 1" OD Tube
2	TL-0012A	1 ¼" to 1 ½" Pipe & 1 ½" thru 2 ½" Sch.160 38mm and 50mm and 60mm/75mm x 8mm< 1 ½"to 2" OD Tube
3	TL-0013A	2" to 2 ½" / 60mm and 75mm
4	TL-0014A	3" 90mm
5	TL-0017A	3 ½" 100mm
6	TL-0018A	4" 115mm

Metric Tube Flaring Dies

Item #	Part Number	Description
1	PFD-M12	12mm Pipe Die
2	PFD-M16	16mm Pipe Die
3	PFD-M20	20mm Pipe Die
4	PFD-M25	25mm Pipe Die
5	PFD-M30	30mm Pipe Die
6	PFD-M38	38mm Pipe Die
7	PFD-M42	42mm Pipe Die
8	PFD-M50	50mm Pipe Die
9	PFD-M60	60mm Pipe Die
10	PFD-M75	75mm Pipe Die
11	PFD-M90	90mm Pipe Die
12	PFD-M100	100mm Pipe Die
13	PFD-M115	115mm Pipe Die

NPS Pipe Flaring Dies

Item#	Part Number	Description
1	PFD-050	½" Pipe Die
2	PFD-075	¾"Pipe Die
3	PFD-100	1" Pie Die
4	PFD-125	1 ¼" Pipe Die
5	PFD-150	1 ½" Pipe Die
6	PFD-200	2" Pipe Die
7	PFD-250	2 ½" Pipe Die
8	PFD-300	3" Pipe Die
9	PFD-350	3 ½" Pipe Die
10	PFD-400	4" Pipe Die

OD Tube Flaring Dies

Item#	Part Number	Description
1	TFD-050	½" OD Tube Die
2	TFD-075	¾" OD Tube Die
3	TFD-100	1" OD Tube Die
4	TFD-125	1 ¼" OD Tube Die
5	TFD-150	1 ½" OD Tube Die
6	TFD-200	2" OD Tube Die

Spare Shaft Support Items

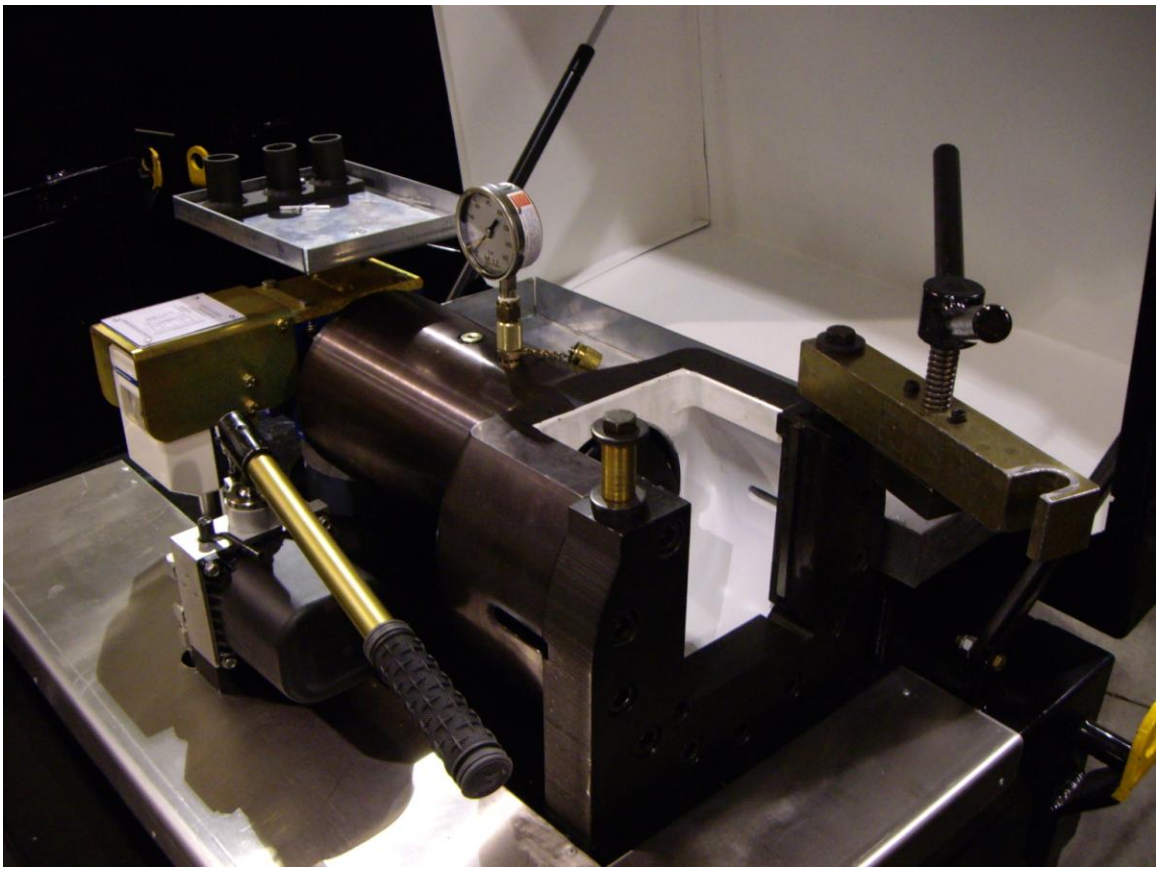
Item #	Part Number	Description
1	TL-0112	Back Plate for bearing removal
2	TL-0113	Front Cover Plate for bearing
3	MHO-62-DA	Snap ring #5000-0244
4	32304	Inner Shaft Support Bearing
5	NJ2305E.TVP2	Outer Shaft Support Bearing
6	TL-0115 Rev A	Complete bearing assembly (Items 1-5)

Spare Consumable Flaring Items

Item #	Part Number	Description
1	Noga S-10	Replacement Reamer Blades
2	80w90 Gear Oil	Gear Oil for Flaring Process
3	Extreme Pressure Grease	Grease for Shaft Support Bearings
4	Dexron III	Oil for Flaring Machine Reservoir

For all other inquires for spare parts please consult factory or local representative

Figure #1



←Back of machine (Cylinder End) **Front of Machine (Flaring End)→**

Figure #2

Figure #3

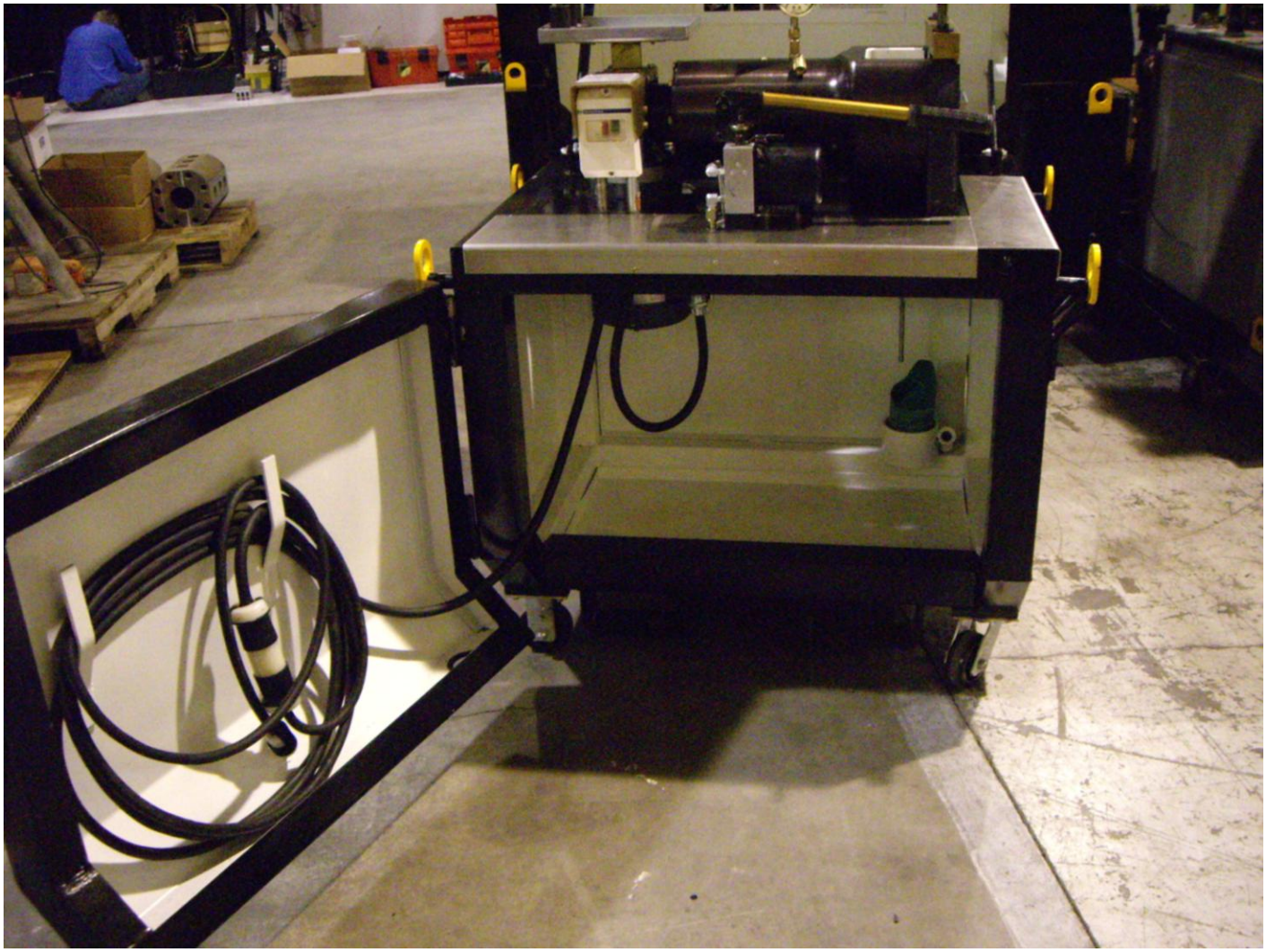


Figure #4

Figure#5

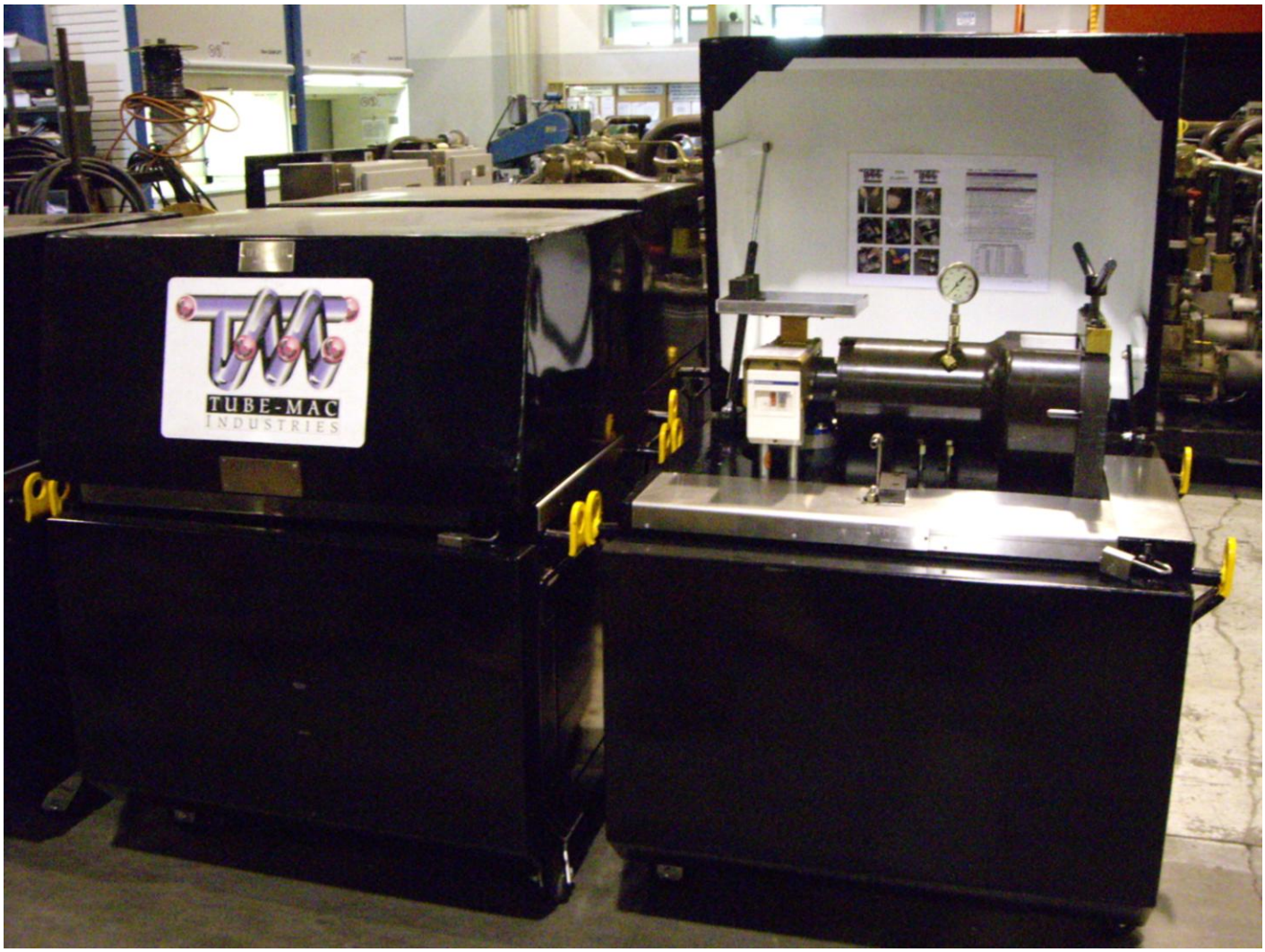


Figure #6

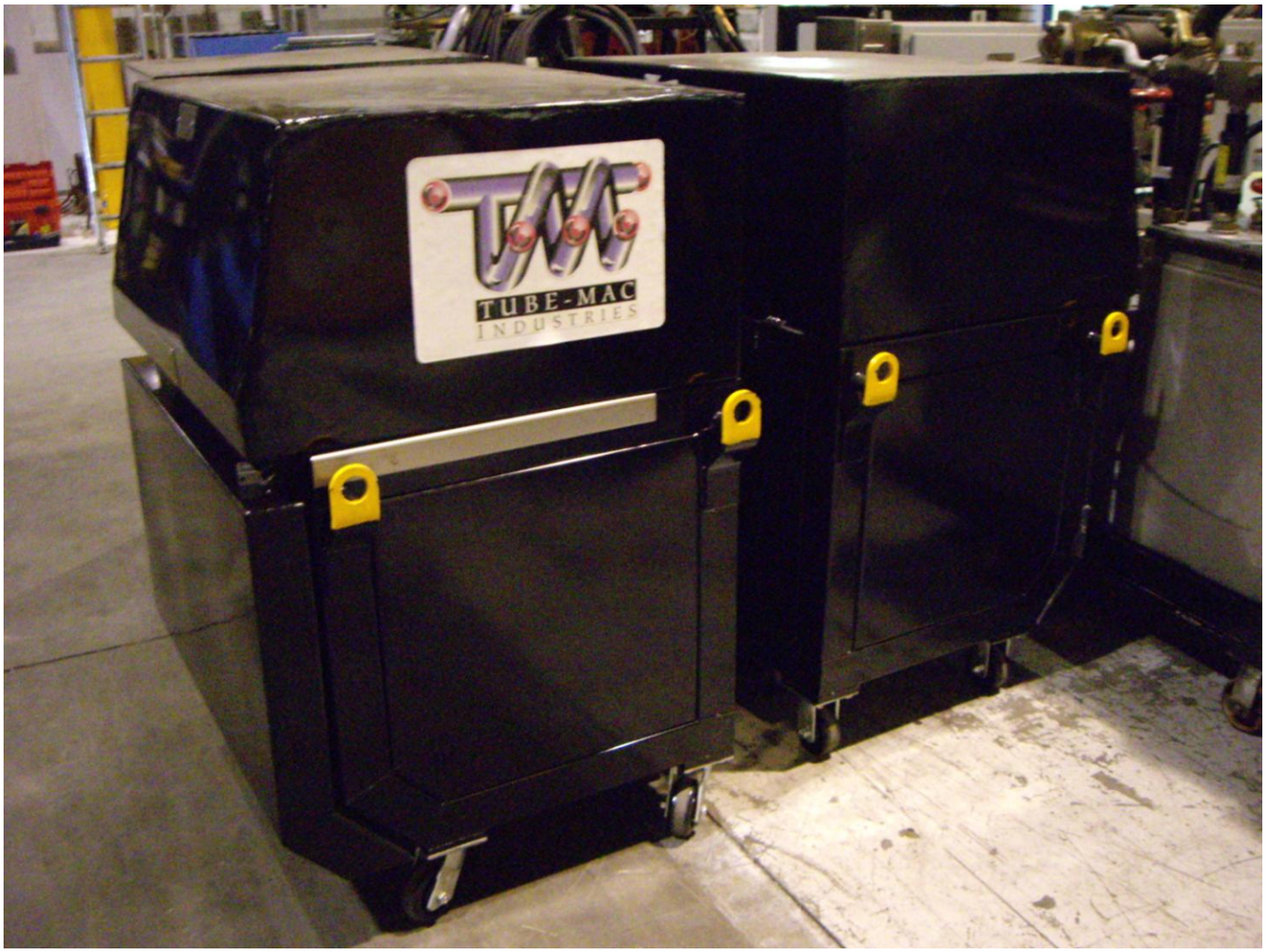


Figure #7