

PIPELINE EQUIPMENT

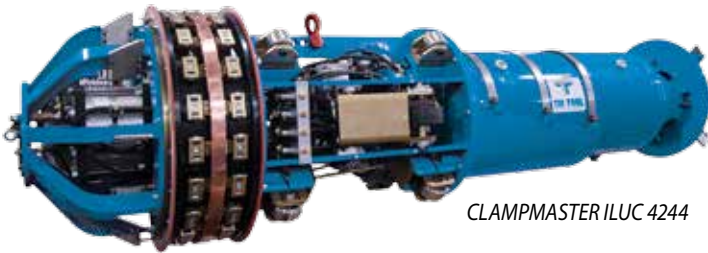


Tri Tool is building performance with our complete line of pipeline equipment, delivering precision and reliability for your pipeline project.



PIPEMASTER PFM 1632

PIPELINE PRODUCTS



CLAMPMASTER ILUC 4244



PIPEMASTER PFM 3248

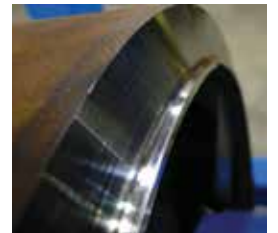
Tri Tool's complete line of pipeline equipment is building performance with speed, reliability and safety for onshore and offshore pipeline construction and maintenance. Together with our on-site pipeline machining and welding services, we deliver performance you can trust.

The PIPEMASTER® series sets the industry standard, as one of the fastest, most powerful pipe facing machines on the market today with cutting capacities up to 76" diameter.

Tri Tool's Internal Line-Up Clamps were developed and perfected in conjunction with the world's top pipe laying contractors. Additional solutions include; weld profile equipment, laser dimensioning systems, coating removal systems, specialty orbital welding equipment, counterboring systems, high speed sever systems and a Video Laser Surface Mapping System that provides comprehensive inspection of the internal weld root pass required for weld certification. Tri Tool is keenly aware that our customers rely on our ongoing engineering research and quality manufacturing to consistently produce the best tools capable of withstanding the harshest of environments.

Because every project is different, we work closely with our customers to engineer the right machine for their unique project. With our experienced engineering and talented manufacturing teams, we can design and produce just about anything your demanding pipeline project requires.

Tri Tool's commitment to exceptional customer service will ensure that you receive the best support for our equipment and on-site services for all of your pipeline project needs.



Where power and precision make all the difference...



Tri Tool's powerful PIPEMASTER PFM 3248 is being positioned into the end of a concrete lined pipeline section prior to performing weld end preparation.

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PIPEMASTER®

PFM 816 Pipe Facing Machine

The PFM 816 is a portable ID mount machine for beveling and facing 8" through 16" pipe. The tool is configured with twin hydraulic motors powering a set of helical gears to drive the main spindle for smooth power.

- **Four ID tracking radial arms**
- **Works on pipe up to 1.60" (40.6 mm) wall thickness**
- **Most powerful Pipe Facing Machine in its class**
- **Safety chip guard with integral auto shutoff**
- **Optional short perch mandrel available**



The high speed PFM 816 demonstrates the machine's optimal cutting ability (and the safety chip guard) by the long blue chips produced by the cut.

PFM 1632 Pipe Facing Machine

The PFM 1632 is a portable ID mount machine for beveling and facing 16" through 32" pipe. This high performance machine is the fastest in the industry, delivering complete bevels in under 2 minutes on 1.5" wall pipe. Can be optionally configured to operate from either side.

- **Widest pipe size mounting range in the industry to 1.85" (47 mm) wall thickness**
- **Most powerful Pipe Facing Machine in its class**
- **Safety chip guard with integral auto shutoff**
- **Optional short perch mandrel available**



The operator of the PFM 1632 is using the on-machine controls versus the full function pendant control (shown).

PFM 3248 Pipe Facing Machine

The PFM 3248 is a portable ID mount machine tool for beveling, facing, and/or counterboring 32" through 48" pipe. Powerful twin hydraulic drive motors and helical gears provide for smooth power delivery and optimal surface finish. A set of hydraulic cylinders with rapid and slow feed control, advance and feed the cutting head into the pipe. The large diameter mandrel shaft provides optimum stability during heavy cutting operations.

- **Widest pipe size mounting range in the industry**
- **Works on pipe up to 2.00" (50.8 mm) wall thickness**
- **Most powerful Pipe Facing Machine in its class**
- **Safety chip guard with integral auto shutoff**



The solid construction of the PFM 3248 is key to its ability to produce perfect surface finishes despite the high rotation speed of the massive cutting head.

(Tri Tool PFMs are available in custom sizes for any application.)

PFM 614 Pipe Facing Machine

The PFM 614 is a robust portable OD mounted machine for beveling and facing 6" through 14" pipe. The rugged PFM 614 is the ideal answer for pipelines where the ID bore is too small for secure clamping, or an ID mandrel would interfere with the machining process. Remarkably short cycle times (from prep to prep) of under a minute can be achieved with this high RPM facing solution. For smaller pipelines, an optional mounting/clamping kit is available that permits beveling on pipe outside diameters down to 4".

- Works on pipe up to 2.48" (63 mm) wall thickness
- Optional short perch kit for limited clamping lengths
- Safety chip guard with integral auto shutoff



A PFM 614 utilizes a set of adjustable stationary locator pads that are opposed by a set of powerful clamping pistons that provide rapid, secure clamping.



The mission critical nature of end preparation is portrayed by this PFM 816, hard at work in the hot desert sands of Oman on a major land-based pipeline project.



A PFM 4876 gets quality and performance checked prior to shipping. Despite its size, it performs with amazing speed, precision and ease-of-use.

Model:	PFM 614	PFM 816	PFM 1632	PFM 3248	PFM 3456	PFM 4876
Standard Pipe Size Range	6 - 14"	8 - 16"	16 - 32"	32 - 48"	34 - 56"	48 - 76"
	168.3 - 355.6 mm	219.1 - 406.4 mm	406.4 - 813 mm	813 - 1219 mm	864 - 1422 mm	1219 - 1930 mm
Rotating Dia.	17.3" (441.3 mm)	24" (609 mm)	40" (1016 mm)	56" (1422 mm)	72" (1829 mm)	84" (2134 mm)
Maximum Wall*	2.48" (63 mm)	1.6" (40.6 mm)	1.85" (47 mm)	2.0" (50.8 mm)	1.88" (47.8 mm)	2.0" (50.8 mm)
Clamping	OD	ID	ID	ID	ID	ID
Tool Holders	3	4	5	5	5	5
Short Perch Kit	(Special Order)	(Special Order)	(Special Order)	(Special Order)	(Special Order)	n/a
Hydraulic Power	Electric or Diesel	Electric or Diesel	Electric or Diesel	Electric or Diesel	Electric or Diesel	Electric or Diesel
Weight	2650 lbs (1202 kg)	2640 lbs (1197 kg)	5200 lbs (2359 kg)	9700 lbs (4400 kg)	9997 lbs (4535 kg)	26,750 lbs (12135 kg)

* Subject to limitations. Specifications subject to change. Call for more information on maximum wall thickness capabilities for your specific application.

INTERNAL LINE UP CLAMPS

CLAMPMASTER®

ILUCs are available in many configurations and sizes to fit your application such as this copper backing shoe configured ILUC 810.



The versatile and easily configurable Tri Tool ILUC Internal Line-Up Clamp series has been developed to provide the

utmost in performance and reliability for internal alignment and positioning of pipeline joints.



An ILUC 810 used for weld backing on small diameter heavy wall pipe.

The efficient, modular design of the ILUC system allows for many different configurations to fit the widest possible variety of applications. Available options

include copper backing for root pass integrity, purge dams for TIG welding, and pneumatic drive systems for horizontal operations. For vertical use, an effective emergency brake system is actuated on loss of pneumatic pressure or electrical current.

Remote control, integral video and laser systems for inspection and operator control are available.

With the OEM support of our special engineering group, virtually any size, configuration or special ability can be addressed for your unique requirements and your most demanding pipeline production applications.



The interlocking copper shoes of this ILUC 1416 are shown in the retracted position that decreases the diameter for unrestricted travel within the pipe ID.



This ILUC 1820 is configured for vertical operation with a strong lifting eye and cable controlled braking system to prevent the clamp dropping down the pipe.



Above, a pair of ILUC 4648 Internal Line-Up Clamps show both the blades and roller system for guidance and reliable positioning within the pipe section.

- **Rapid, dependable alignment for pipeline welding**
- **Fifteen model sizes for pipe from 6" to 60"**
- **For some pipe gauges, rounding operations may be possible on internal clamp sizes 18" and above.**



The ILUC 4244 above not only provides precise alignment, it is fitted with purge dams that form a weld gas controlled chamber surrounding the backing shoes.

Model:	CLAMPMASTER ID Range*		Configurations	Optional items Include:
ILUC 6	4.20" - 7.22"	106.68 - 183.38 mm	<ul style="list-style-type: none"> • S - Lay • J - Lay • Double Joint 	<ul style="list-style-type: none"> • Video Laser Surface Mapping • Copper Backing Shoes • Gas Purge System • Integral Drive Motor • Emergency Brake • Wireless Remote Control • Wired Umbilical Control • Stainless Contact Components • Slip Ring (ILUC 1012 and above)
ILUC 810	5.20" - 9.12"	132.08 - 231.65 mm		
ILUC 1012	8.50" - 12.60"	215.9 - 320.04 mm		
ILUC 1416	12.60" - 15.25"	320.04 - 387.35 mm		
ILUC 1820	15.25" - 19.25"	387.35 - 488.95 mm		
ILUC 2224	19.25" - 23.25"	488.95 - 590.55 mm		
ILUC 2628	23.25" - 27.25"	590.55 - 692.15 mm		
ILUC 3032	27.25" - 31.25"	692.15 - 793.75 mm		
ILUC 3436	31.25" - 35.00"	793.75 - 889.0 mm		
ILUC 3840	35.35" - 39.00"	897.38 - 990.6 mm		
ILUC 4244	39.25" - 43.00"	996.95 - 1092.2 mm		
ILUC 4648	43.25" - 47.00"	1098.55 - 1193.8 mm		
ILUC 5052	47.25" - 51.00"	1200.15 - 1295.4 mm		
ILUC 5456	51.25" - 55.00"	1301.75 - 1397.0 mm		

* Specifications subject to change. Call Tri Tool for more information on a pipeline welding alignment solution for your specific application.

INTERNAL WELD INSPECTION

Video Laser Surface Mapping System

The Video Laser Surface Mapping system (VLSM) is designed as the optimal solution for applications where Internal Line-Up Clamps with purge gas capabilities are utilized for welding pipe with stainless, Inconel®, or other special corrosion resistant alloy lined bores. This is especially true for pipelines with smaller ID diameters that prevent direct physical inspection. Tri Tool's advanced VLSM system provides immediate and comprehensive inspection of the internal weld root pass required for weld certification in a production workflow.



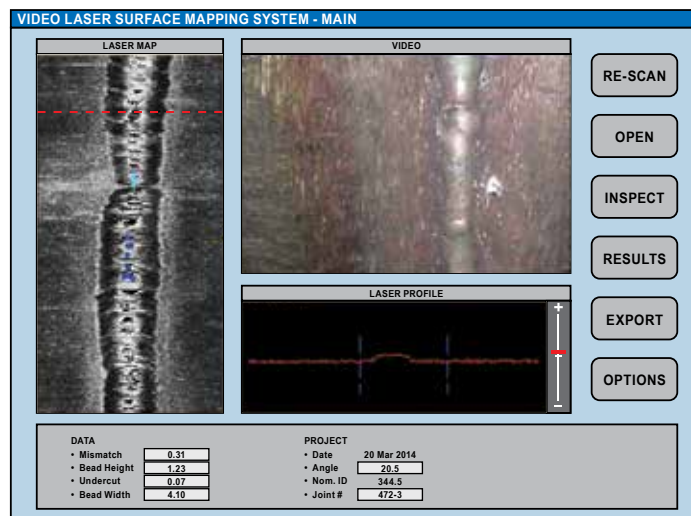
A Tri Tool custom built internal clamp was designed to provide 2D imaging, 3D laser surface inspection, along with precision welding alignment.

The VLSM system is increasingly important with higher levels of sour gas encountered with oil and gas production of today. With piping systems designed to resist the damage of more corrosive materials, the inspection of the root pass integrity is of critical importance. The VLSM addresses this need with an easy-to-use system with practical control and programmable parameters for pass-fail simplicity of operation.

The VLSM can be integrated into Tri Tool's ILUC series for a rapid and dependable combined solution for precision weld alignment and follow-up inspection and reporting.

Featuring a laser and color video camera the system performs:

- Laser inspection for correct bead height
- Laser inspection of pipe alignment mismatch
- Inspection for cracks, porosity, burn through, arc burns, gouges, notches, dents, and oxidation/coking
- Reliable, accurate digital reporting of results



The VLSM system features practical inspection software. The screen image above shows live video combined with laser dimensional data recorded at that spot.

High-Production CNC On-Site Deep Counterboring Service

Our CNC High Speed Deep Counterbore Service delivers unprecedented accuracy and superior finishes through a true seven axis CNC machining capability.

The computer controlled system is also equipped with real time monitoring of the cut, and features our patented laser-assisted pipe end alignment for rapid pipe to pipe cycle times.

The system's 100% mechanized pipe rack requires no manual pipe handling for maximum safety.

The equipment is manned by Tri Tool's on-site machining technicians who are fully certified in CNC counterboring, committed to safety, and knowledgeable in both onshore and offshore pipeline construction.

The Counterbore Service, headquartered in our Houston facility, supports onshore fabrication companies worldwide.



Tri Tool's Counterboring Service is performed on a fully mechanized pipe rack, designed to ensure for maximum safety and high-performance cycle times



Two fully automated work stations, one for each end of the pipe, provide true 7 axis machining for unprecedented control over the deep counterboring process.

- Counterbores 6" through 16" API pipe
- Counterbore depth up to 12"
- CNC control for rapid alignment, and operation
- Patented laser-assisted pipe end alignment
- Integrated machine guard protects operator
- 100% Mechanized no manual handling of pipe
- Surface finish of 125 micro-inches RMS or better
- Rapid pipe to pipe cycle times
- Automated hooked end compensation
- Variable lead-out and transition radius capability

600 Series Deep Counterbore System

This system, based on the dependable 600 Series Clamshell platform, generates extremely accurate, deep counterbores critical for SCR quality fit-ups. The deep counterbore system features a reliable and easy to use auto-feed mechanism, and is powered by a high speed hydraulic motor. This system offers remarkable precision of the SB's sliding bronze bearing technology for optimal accuracy and repeatable results.

- Produces a one step, high-quality surface finish
- Most accurate deep counterborer available
- Consistent RMS 125 finishes while holding .010 tolerance on taper at 8" deep



Tri Tool's 600 Series SB and TRIMAX Clamshell lathes provide a stable and secure platform for precision counterboring, an absolute necessity for effective pipe matching and testing.

PRECISION PIPE MEASUREMENT

Laser Dimensioning System

The Laser Dimensioning System (LDS) offers portable, ultra precision measuring for the pipe end matching process.



Using highly accurate laser sensors, the LDS determines physical displacement without contacting the object. A servo driven rotating

platform is securely mounted into the pipe with an integrated self-centering 3 jaw mandrel.

- **Positive pneumatic mounting**
- **Measures full 360° rotation**
- **Simple set-up and operation**
- **Automatic serialization capabilities**
- **Reliable and accurate recording**
- **Custom application designs available**



Tri Tool's Laser Dimensioning System records precise measurements of each pipe end so that ends can be accurately matched for improved welding results.

The control unit measures internal and external dimensions at reference points around the circumference of the pipe end. Those dimensions are then recorded graphically or by spreadsheet. Precise ID, OD, and wall thickness are recorded, enabling pipe to be sorted according to whether specific wall thickness and optimum fit criteria, etc. have been met.

Tri Tool Services can provide on-site Laser Dimensioning operations for your pipe end matching requirements.

COATING REMOVAL SYSTEMS

Remove Pipe Coatings Quickly and Easily

Tri Tool Coating Removal Systems have been developed to address challenges that are faced during pipeline maintenance that require the practical and efficient removal of tough pipe coating materials.

- **Configurations available for both form-tooling or end milling type removal of coating**
- **Total control of depth of cut and lead-out angle**
- **ID Mount equipment for pipe end coating cutting**

Utilizing our proven pipe cutting technologies and experience, both ID and OD mounted equipment has been adapted to meet this challenge. Up to 4" (101 mm) thick coating can be reliably removed from the OD of coated pipe, using a surface tracking module that controls the depth of cut to prevent cutting into the parent material of the pipe.

Designed with a wide cut path and up to 12" of axial travel, coating removal equipment can produce a wide removal area, including any desired lead-out bevel.



This section of offshore coated pipe is having the coating removed with an in-line, OD mounted TRIMAX split-frame lathe utilizing form tooling.

Custom coating removal equipment can be designed around either form tool cutting or milling operations, depending on the specific materials and cut geometry.

Our special engineering can develop the right coating removal solution for your exact requirements and Tri Tool Services can provide experienced on-site coating removal equipment operators for your project.

HSS - High Speed Sever System

The HSS System is designed on Tri Tool's rugged and reliable OD mounted Clamshell split frame lathe.

The High Speed Sever system is primarily used for high speed simultaneous sever/beveling of in-line pipe for offshore weld cut-outs, a high production environment where rapid cutting speed is important while maintaining precision machining.



Nickel-plated High Speed Sever system, built to customer specifications, performs a critical role for rapid weld remediation on a pipelay vessel.



A custom manufactured Clamshell based High Speed Sever System precisely bevels an outer pipe without disturbing the inner pipe.

The HSS features OD tracking for dependable compensation for out-of-round conditions. The versatile Clamshell platform is ideal for performing a wide range of special operations such as pipe-in-pipe machining and template tracing cuts.

These machines are ideal for weld remediation on pipelay vessels when a defective weld needs to be rapidly cut and simultaneously beveled - ready for rewelding. The High Speed Sever System can be nickel plated for durability to salt spray, the perfect finish when used on offshore pipe lay vessels.

WPS - Weld Profiling System

Tri Tool's WPS is a patented process for weld crown removal that strengthens the weld and produces a smooth surface, better for X-ray and A.U.T. testing. The WPS system utilizing our proven 600 Series Clamshell can profiling either the ID or OD surface as required. We can provide you with rapid and reliable on-site profiling solutions through Tri Tool Services.



This WPS shows the ability to mount in-line on a welded pipe and produce a smooth transition across the weld prior to re-coating for corrosion control.



The almost mirror-like surface of the Weld Profiling System is a result of the stable Clamshell platform. Tracking wheels shown guarantee height control.

The right Equipment for Your Project

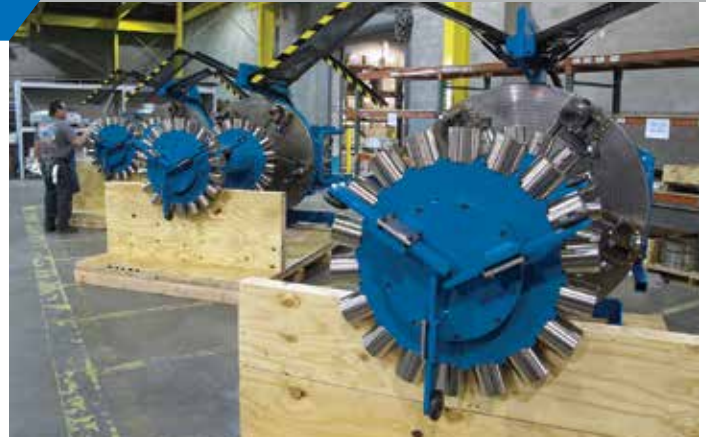
Tri Tool is committed to being your first choice for pipeline rental equipment. With our expanded warehouse and service capabilities in our Houston, Texas office, we are focused on delivering our high performance equipment when you need it, at competitive rates.

- **New minimum rental periods**
- **Competitive rental rates**
- **Improved equipment availability**
- **On-site training from our certified technicians**

As the original equipment manufacturer, Tri Tool ensures that each and every piece of mission critical pipeline equipment delivers the precision and dependability you expect.

Whether you choose to rent equipment only or to subcontract to Tri Tool for your pipeline service needs, you can trust that your project will be completed with precision.

If a customer chooses, all rental costs for pipeline equipment can be applied to purchase the equipment under our convenient and cost-effective Rent-to-Buy program.



Rental of Tri Tool's high-performance PIPEMASTER pipeline equipment is an important project management option for saving time and costs.



A new CLAMPMASTER Internal Line-Up Clamp ready for deployment.

Dependable Power for PFM Series

The heavy-duty, dual-pump Model 75-60/5 HPU (60 GPM and 5 GPM), pressure compensated, hydraulic supply unit is designed specifically to provide power for Tri Tool's PFM Series equipment. The 5 GPM pump (at 2000 psi) provides feed and clamping power and the 60 GPM pump powers the cutting head drive.

The powerful and reliable HPU 75-60/5 is pendant controlled (up to 50 ft. away) and is skid mounted for increased portability on the project work site.



The Model 75-60/5 HPU ensures that you are getting the maximum benefit and performance for all of your pipeline rental equipment.



A diesel powered HPU providing hydraulic power to a PIPEMASTER PFM 1632. The HPU unit is fully controlled by means of the operator pendant.

- **Optimum pressure response to cutting loads**
- **Filtered to prevent contamination entering the pump**
- **HPUs can be designed to your specific project needs**
- **Standard Electric and optional Diesel HPUs available**

Both the diesel and electric versions of the Model 75-60/5 HPU can be rented as a standalone to serve as a primary power center for many heavy duty and high performance, self contained applications that require reliable hydraulic power.

Mechanized, Multi-Process Welding

Tri Tool's AdaptARC mechanized multi-process welding system features the versatile OrbitMaster® programmable weld controller, and DualARC® weld head for GTAW, FCAW, GMAW-P (Pulsed Spray) and GMAW-S (Short Arc). AdaptARC weld procedures can be developed for exotic and highly corrosion resistant pipe.

AdaptARC's advanced welding technology delivers the high deposition and head speed rates, repeatable precision, ease-of-use, and rapid changeover between modes that is setting new productivity standards for Oil and Gas pipeline projects.



Tri Tool welding technicians performing specialized welds on highly corrosion resistant super duplex stainless steel pipe for a geothermal project.



Two Tri Tool DualARC orbital weld heads operating simultaneously on a single mounting track for maximum weld deposition on an onshore LNG project.

Tri Tool and the Alaska Pipeline

Tri Tool's special engineering team can develop and manufacture custom equipment based on proven designs, to meet virtually any project requirement or specific work situation.



Our engineering department has a quarter century of experience in providing machine tool solutions to satisfy the most rigorous and demanding specifications.

Tri Tool's advanced special engineering capabilities were

utilized to safely and successfully complete a pipeline maintenance project on the Alaska Pipeline.

By modifying our split-frame lathes, workers were able to sever out a section of the pipeline that contained a malfunctioning valve, while ensuring that the new valve section could be welded in accurately and with a minimal amount of down time.

For any special needs, don't hesitate to call Tri Tool for experienced technical design assistance for any pipeline machining or welding requirements.

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