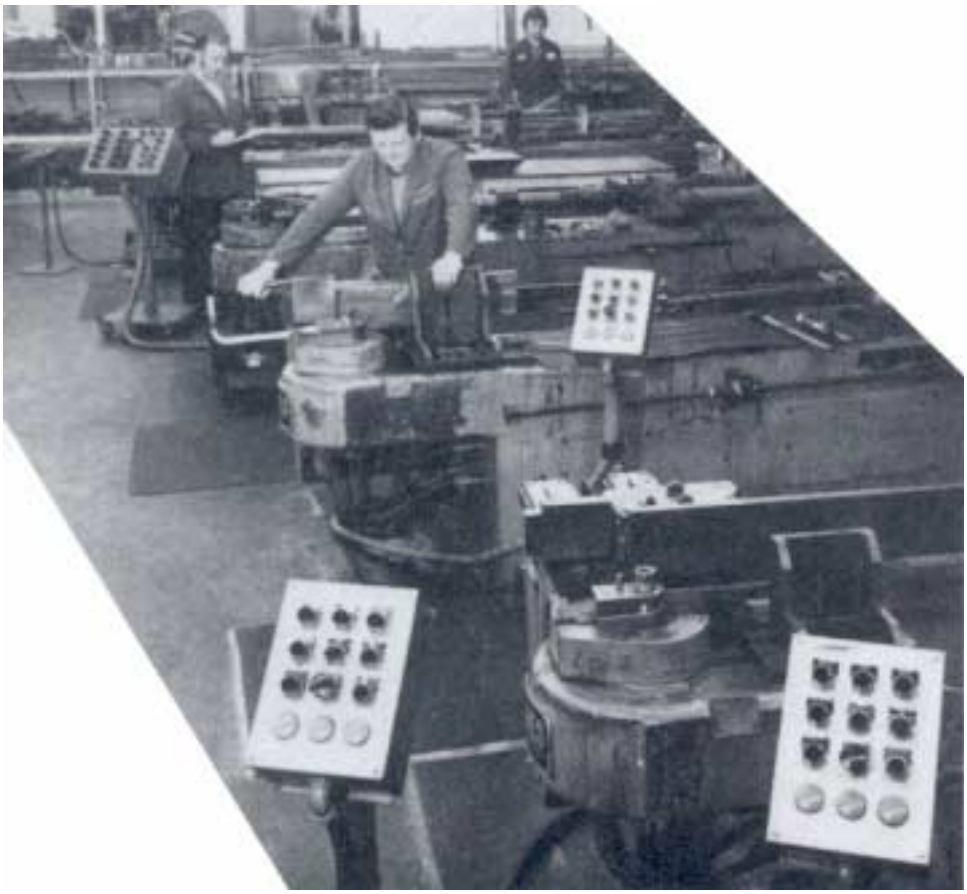
RECTANGULAR & DOUBLE-RIDGE WAVEGUIDE ASSEMBLY MANUFACTURING

- HIGH YIELD
- PRECISION COMPONENT
- MODERN MANUFACTURING TECHNIQUES
- SYSTEMS ENGINEERING RELIABILITY



- READILY AVAILABLE WAVEGUIDE
- SUPERIOR ELECTRICAL AND MECHANICAL CHARACTERISTICS
- LOW PRODUCTION COST
- 100% RF TESTING

Production Bending Facility

MICROWAVE ENGINEERING CORPORATION
1551 OSGOOD STREET, NORTH ANDOVER, MA 01845 • TEL (978) 685-2776 • FAX (978) 975-4363
Website: www.microwaveeng.com, Email: sales@microwaveeng.com

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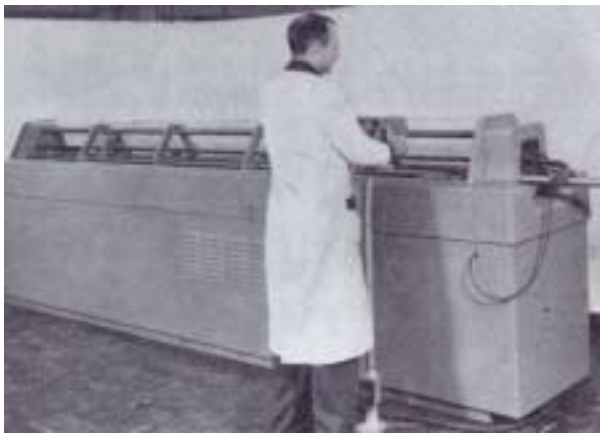
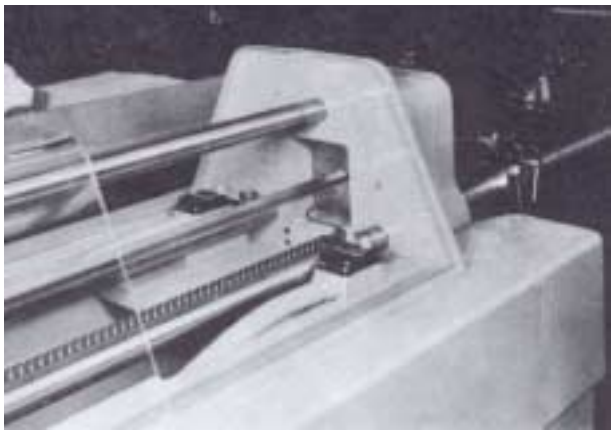
MANUFACTURING SUPERIOR WAVEGUIDES SYSTEMS FOR TODAY'S SEVERE REQUIREMENTS





Rapid Automatic Waveguide Stock Cutting

Microwave Engineering Corporation's Waveguide Division has developed the most modern and sophisticated facility for bending, forming, machining, brazing, electrical testing, and finishing waveguide assemblies in existence today. This facility utilizes state-of-the-art-techniques and machinery such as precision hydraulic bending, twisting, and forming machines and programmable milling, drilling, and chucker operations. The latest techniques of producing exotic multiple bends and twists over a wide range of waveguide sizes, together with the most advanced swept-frequency reflectometer R-F test methods assure highest quality with the most reliable waveguide system performance.

Precision Hydraulic Bending

Hydraulic Press Forming

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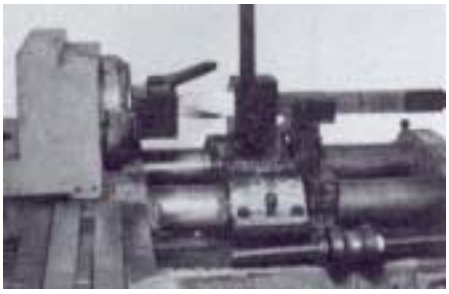
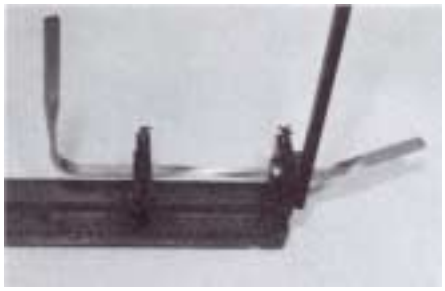


Hydraulic Twisting Machine



Hand Twist Jig

Personnel who have spent years perfecting the skills necessary to implement these advanced processes are the core of our production capability. Our bending and brazing artisans, toolmakers, and technicians form a close working team. Each is thoroughly trained in every aspect of his production, resulting in optimum process interface and compatibility. All are aware of the importance of inner dimensions, surface finish, and tolerance as factors which affect SWR, insertion loss, and power handling capability.

Internal Mandrel Maintains Precise Dimensions During Bending

Mandrel In Place On Bending Machine

CNC Milling of Flanges

A Waveguide Bend In Progress

Automatic Flange Machining

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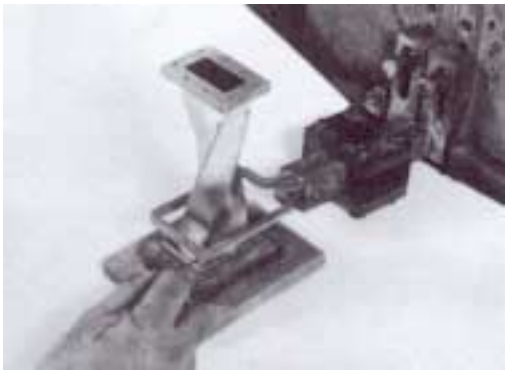
Electrical In-Process Inspection

Mechanical In-Process Inspection

In-process electrically oriented surveillance of mechanically obtained results is maintained. This enables us to adjust mechanical processes to be consistent with the desired electrical end result.

Mechanical Inspection Fixture

Superior brazing techniques utilizing induction methods for brass and copper, with dip brazing for aluminum boost reliability of braze joints and provide high production at reasonable cost.



Induction Brazing

MEC-engineered braze process controls which are specifically designed for waveguide brazing give high reliability and long life. Our in-house X-ray equipment provides radiographic confirmation of joint integrity.

Aluminum Dip Brazing

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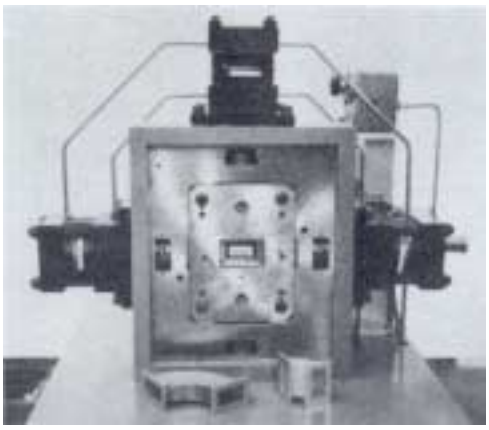
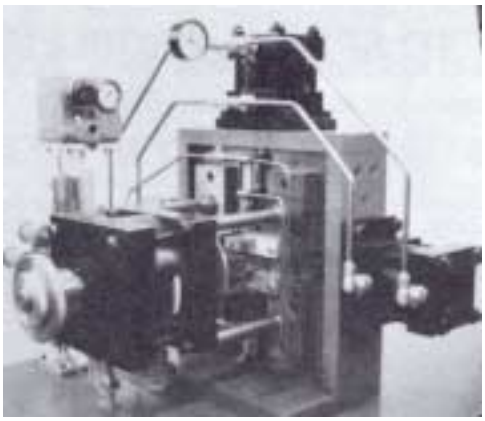
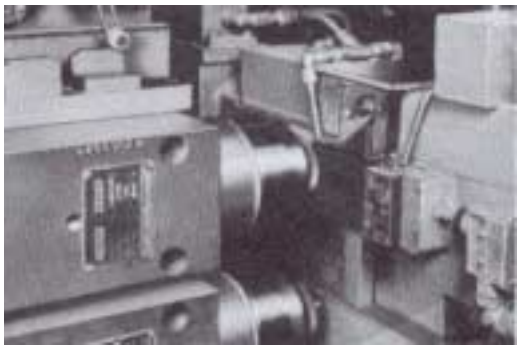


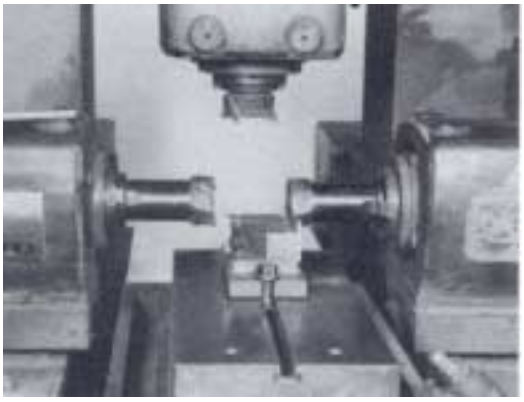


MEC-Built Automatic End Sizing Machine

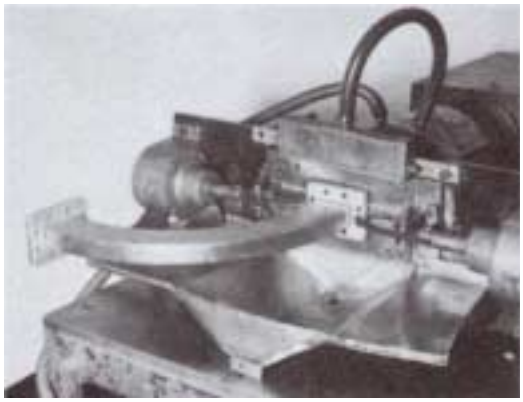
Specially Designed Miller
Automatically Machines
Flange In Place On Waveguide



Close-up Of Flange
Cutting



Multiple-head Miller
For Dependable Face-off



Multi-spindle Drill For
True-tolerance Flange
Hole Pattern

Specialized machining processes are used on long production runs to assure high quality rapid machining of assemblies. Stringent requirements of flange parallelism and perpendicularity necessary for proper system installation and performance are easily met. The flanging process employed by these machines assures true-position tolerancing of all necessary dimensions from the centerpoint of the waveguide opening, not from nominal outside dimensions.

Facilities for interior and exterior finishing of completed assemblies are maintained in-house at MEC. Chemical cleaning, chromate conversion, painting and plating facilities adhering to strict military standards enable us to maintain tight controls of production schedules.

Careful final mechanical inspection, plus 100% R-F testing of all components is the rule at MEC. Inspection procedures in accordance with MIL-I-45208a are maintained. Complete R-F test labs with 1 – 90 GHz frequency capability, as well as high power and environmental test facilities to simulate actual system situations allow complete confidence in system performance.

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RECTANGULAR & DOUBLE-RIDGE WAVEGUIDE ASSEMBLY MANUFACTURING

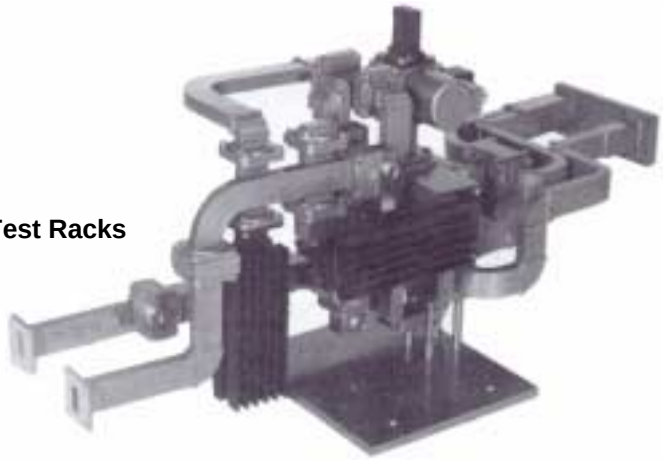
SOME UNIQUE SOLUTIONS TO SPECIAL PROBLEMS

- MEC DESIGNED CASTINGS FOR TIGHT FIT AREAS
- CNC MILLING MAKES INNOVATIVE PACKAGING POSSIBLE
- FLEXIBLE SEAMLESS WAVEGUIDE MANUFACTURE IN-HOUSE MAKES SYSTEM RESPONSIBILITY POSSIBLE

Tight Radius Swept Bend

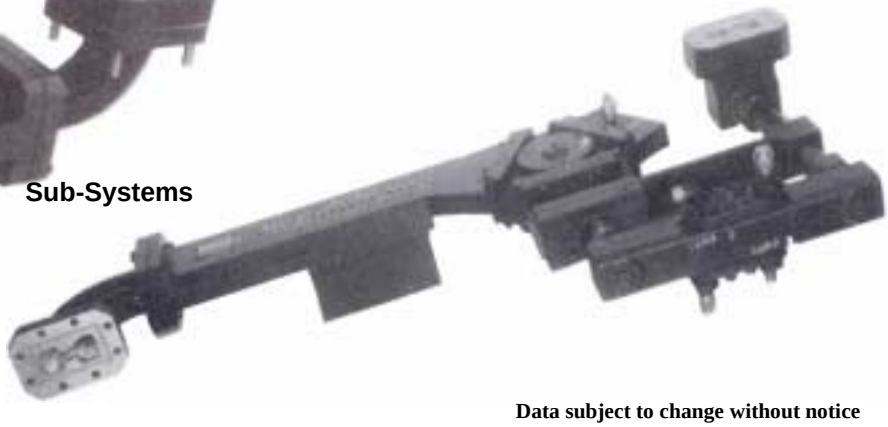
Heavy Wall

Flexible Waveguide



Test Racks

Sub-Systems



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BENDING TOOLS

Following is a current list of bending tools in stock. However, since tool inventory is continually being expanded, it is suggested that MEC be contacted if the desired bend radius is not shown.

INSIDE RADIUS (inches)	WR																MEC†			WRD							DR 19
	15	22	28	34	42	51	62	75	90	102	112	137	159	187	229	284	F750	F700	F400	180 C24	750 D24	650 D28	580 D28	475 D24	350 D24	200 D24	
.25	H	HE	E						E												E						
.34		E																									
.375									E§																		
.38	HE																										
.5	H	H	HE	HE	HE	HE	HE	HE	HE		HE	HE								HE	HE	E		E			
.5									H‡E‡																		
.54		E																									
.625	HE						H																				
.688											E																
.74		E																									
.75			HE						HE	E		H		H						HE	HE	HE		HE			
.86		H																									
1.0			HE				HE	HE	HE		HE	HE		E						HE	HE	HE	H*E*	HE	E		
1.125									H		E																
1.25							H		HE		H										H	H					
1.5							E		HE	E	HE	HE		E				H	E		H	HE		HE	H	E	E
1.5							H														E*			E*			
1.688											E																
1.75									E														H				
2.0							E	H	HE					E		E	H*E*	H*E*			H*E*	H*E*		HE			H
2.0																					H	HE					
2.34																					E	E					
2.5																					H*E*	H*E*					
2.5																						HE					
2.75									E		HE																
3.0										H	HE	E	HE	HE	E	HE										E	
4.0									E			HE	HE	HE		H		E								H	
5.0														H													
5.55																		H*									
6.0															H												
8.0														H		HE											

Special application calling for reduced-height waveguide can be manufactured with minor modification to the above tools.

*** Center Line Radius** **+ .010 Wall** **‡ Heavy Wall** **§ Half Height**

†MEC FLATGUIDE® is reduced-height rectangular waveguide, which is compatible with double ridge waveguide for systems installations:

DOUBLE-RIDGE WAVEGUIDE	MEC FLATGUIDE	FREQUENCY BAND (GHz)	INTERNAL DIMENSIONS
WRD-750D24	F750	7.5 – 18.0	.312" X .847"
WRD-750D24	F700	7.0 – 18.0	.320" X .965"
WRD-475D24	F400	4.0 – 10.4	.506" X 1.668"

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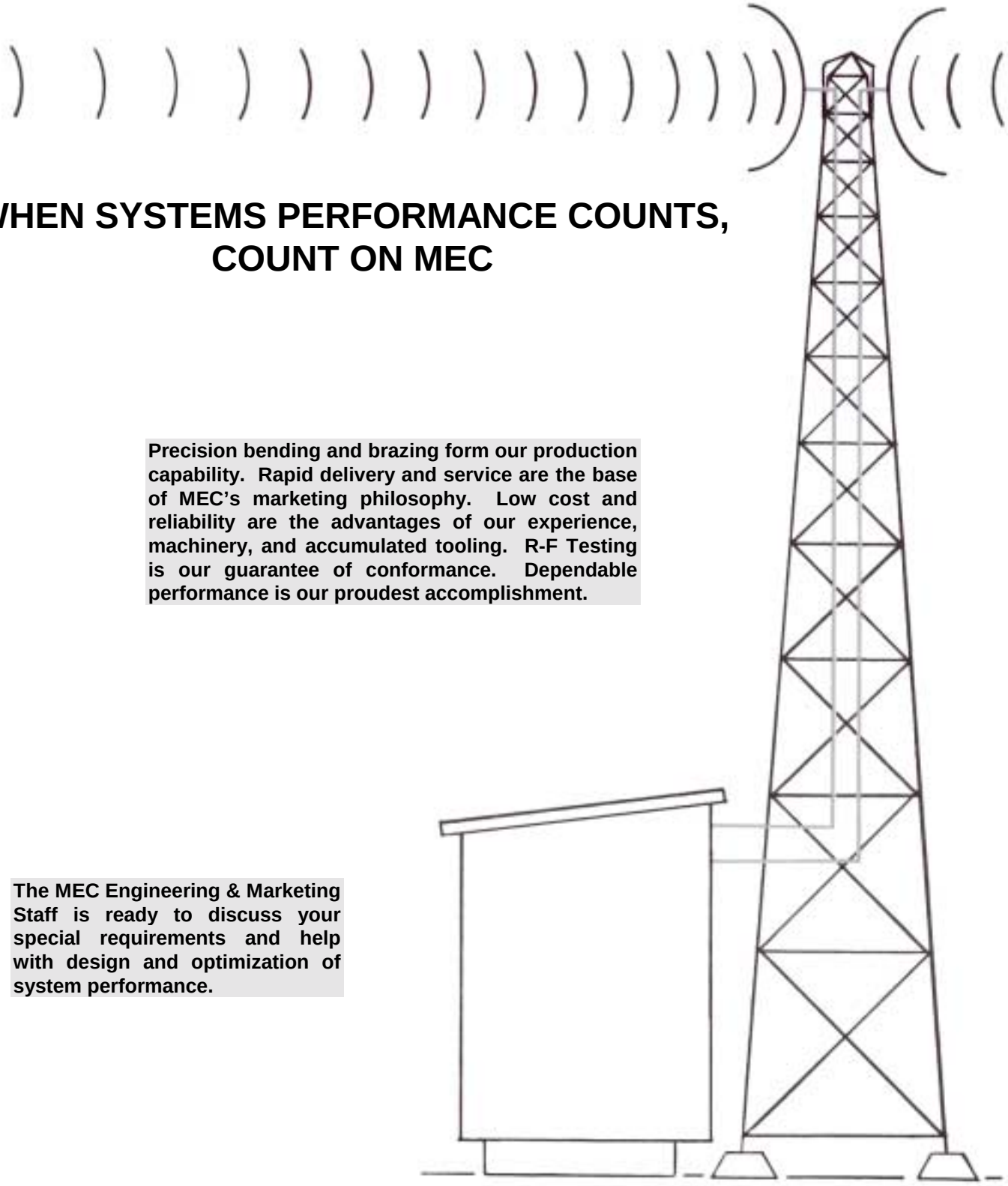

WHEN SYSTEMS PERFORMANCE COUNTS, COUNT ON MEC

Precision bending and brazing form our production capability. Rapid delivery and service are the base of MEC's marketing philosophy. Low cost and reliability are the advantages of our experience, machinery, and accumulated tooling. R-F Testing is our guarantee of conformance. Dependable performance is our proudest accomplishment.

The MEC Engineering & Marketing Staff is ready to discuss your special requirements and help with design and optimization of system performance.

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