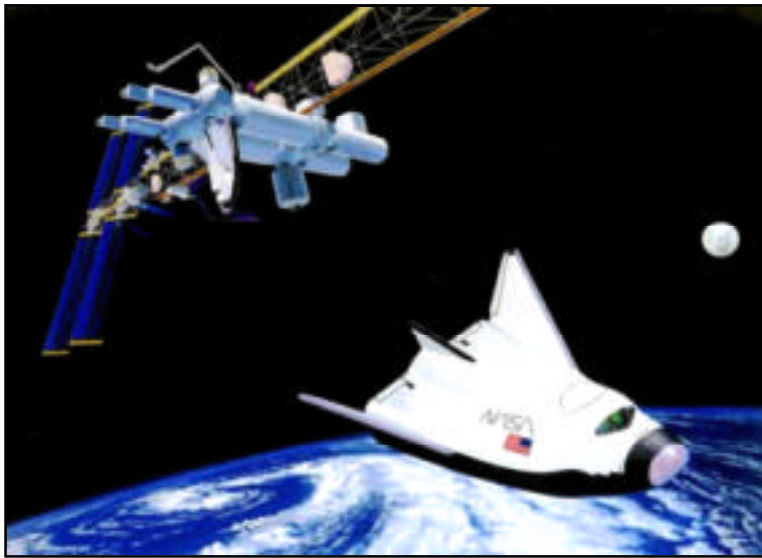


# *Stress Relief Confidence:*

- ▶ *Effective*
- ▶ *Efficient*
- ▶ *Consistent*



*"Meta-Lax has been very beneficial to NASA and is used frequently."* - NASA

*"Meta-Lax is a proven substitute for 80-90% of heat treatment stress relief applications."*

- U.S. Department of Energy

**META-LAX**<sup>®</sup>  
Stress Relief & Weld Conditioning

by

**BONAL**   
TECHNOLOGIES C  
SUBSIDIARY OF BONAL INTERNATIONAL, INC.

# META-LAX<sup>®</sup> is

## ► *Effective*

**Bonal Technologies' patented Meta-Lax process delivers confidence! Meta-Lax is the first and only vibration process proven to be as successful as heat treat stress relief in effectiveness AND consistency. When efficiency is added (i.e. economy and convenience) Meta-Lax equipment becomes your best stress relief and weld conditioning value.**

### Customer Comments

*"We've virtually eliminated all of our heat treat stress relief costs without sacrificing quality."* WesTool

*"Since using Meta-Lax, we hold dimensional tolerances as never before."* NASA-Langley

### Competitive Benefits

- Meets heat treat stress relief quality
- 95% less processing costs (typical payback 6-9 months)
- 98% less processing time
- 95% less weld distortion
- 95% less weld cracking
- NO treatment distortion
- NO size or weight limitation

### Research Conclusions

*"There is evidence that the Meta-Lax system is performing comparable to the thermal stress relief process"*

U.S. Department of Energy

*"The findings demonstrate that the frequency [for optimum vibration stress relief] is always in a sub-harmonic range."*

Lockheed Missiles & Aerospace

### Machining



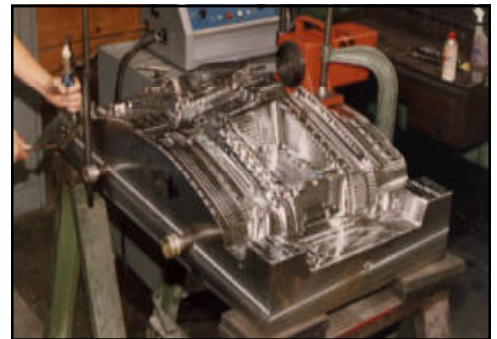
Consistently effective, quoted \$150,000 less.  
State Fabricators

### Fabricating



Reduced weld distortion 85%.  
General Motors, MCD

### Mold Making



Eliminated heat treat stress relief costs.  
Paragon Die

### Die Casting



Doubled die life.

Global Technologies

## Defense



Eliminated 50% scrap rate.  
U.S. Army-Watervliet Arsenal

## Aerospace



Quality assurance.  
NASA-Edwards AFB

## Mining



Nearly eliminated breakage.  
EIMCO

## Racing



World Record Holder (piston).  
Cooper's Express / Miss Meta-Lax

# META-LAX<sup>®</sup> is *Efficient* ◀

**Bonal** has earned a reputation for achieving nearly *100% Customer Satisfaction*. That is evidenced by the high percentage of customers ordering additional equipment and by their numerous referrals. **Bonal's** unique method of documenting when stress relief is complete assures confidence. Your satisfaction with Meta-Lax and Bonal is expected for years to come.

## Customer Comments

*"The Meta-Lax process is our preferred choice of stress relief for many reasons."* General Motors, T&B

*"Quality? You can't do precision machining without it."* Parker Boring

## Materials

- Low Carbon Steel: 1020, A36, 4620, 8620
- Medium Carbon Steel: 1045, 1060, 4140, 4340, H13, P20
- Tool Steel: A2, D2, M1, M2, M3, S7, HY80, HY100
- Aluminum: 356, 2000's, 5000's, 6000's, 7000's
- Stainless Steel: 304, 316, 410, 416, 420
- Cast Iron: Gray, Nodular, Meehanite
- Exotic Metals: Titanium, Inconel, Magnesium, Gold

## Weld Conditioning

Meta-Lax Weld Conditioning is applying Bonal's Meta-Lax stress relief process *during welding*. Weld conditioning relieves thermal stress as it is being induced during weld solidification. The major advantages are eliminating up to 95% weld distortion and weld cracking. Other bonus benefits will also be gained.

Metallurgically, a finer, more uniform weld grain results. Ductility and impact values are significantly higher, up to 400% and 75% respectively.

# META-LAX<sup>®</sup> is

## ► *Consistent*

In the long run, Bonal's Meta-Lax equipment will be one of the most valuable assets in your plant. You will gain flexibility in quoting, increased efficiency in production, confidence in completion, and quality results, all while earning higher profits. That's the *Meta-Lax* advantage!

### Customer Comments

"We saw our scrap rate go from 50% to 0% and stay there."

US Army-Watervliet Arsenal

"We produced 680 autobody carriers with excellent results in the stability of the frames."

General Motors, MFD

### How does Meta-Lax Work?

The Meta-Lax process vibrates a workpiece at its *sub-harmonic* energy level. The sub-harmonic zone is the optimum zone when using vibrations.

All metal structures exhibit harmonic and non-harmonic behavior (**1st Scan**). A metal component that contains thermal stress (i.e. from thermal shock) displays its harmonic curve as being out of phase from its natural frequency location, much like a musical instrument being out of tune. By applying sub-harmonic vibrational energy, the pockets of high stress concentrations are redistributed, thereby reducing the effects of thermal stress. Graphically, the harmonic curve shifts slightly (**2nd Scan**) but stabilizes into its *natural* frequency as the workpiece becomes relieved of thermal stress (**3rd Scan**).

### About Bonal Technologies, Inc.

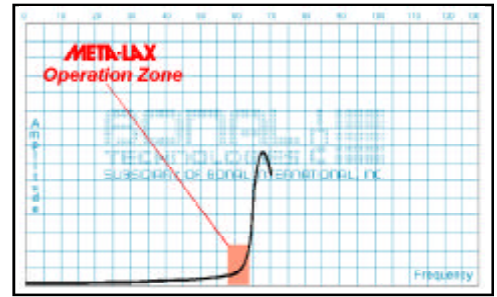
Bonal is the pioneer, patent holder, and with its licensees, the world's only provider of sub-harmonic vibrational equipment. The company originally tried using "resonant" vibrations in their own planer/mil machine shop and found that it was very inconsistent. Then they developed a consistent technique - "Meta-Lax". Bonal also discovered that the Meta-Lax process was an asset when used during welding - Meta-Lax Weld Conditioning.

In addition to manufacturing a full line of Meta-Lax equipment, from basic to computerized, Bonal provides on-site services and consultation to the mold making, automotive, aerospace, defense, machine tool, die casting, mining, power generation, shipbuilding, and high performance racing industries.

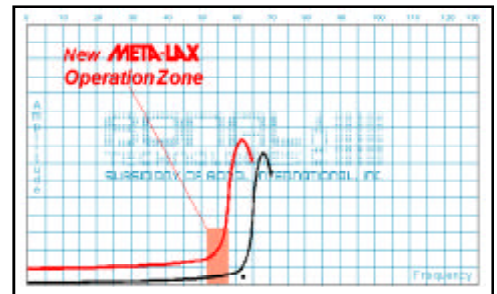
Bonal Technologies, Inc. is a wholly-owned subsidiary of Bonal International, Inc., a publicly held OTC company (BONL).



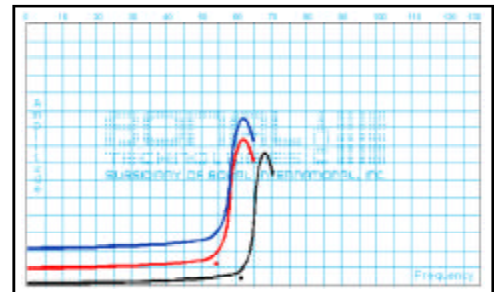
1300 North Campbell Road • Royal Oak, MI 48067 • USA  
Voice: (248) 582.0900 • Fax: (248) 582.0901  
info@bonal.com • 1-800-META-LAX



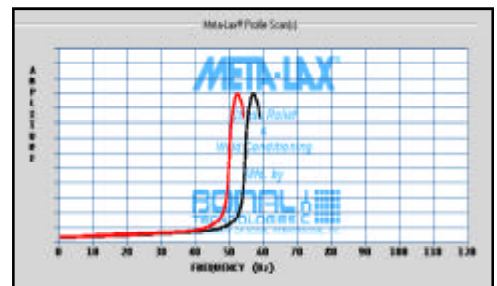
**1st Scan:** Represents initial harmonic response of workpiece. Sub-harmonic zone displayed.



**2nd Scan:** A reduction in thermal stress level of component is represented by a change in the frequency of the harmonic curve.



**3rd Scan:** Harmonic curve repeats previous scan certifying that Meta-Lax stress relief is complete.



### Computerized Certification Sheet:

Note, intermediate scans do not appear. The computer processes the workpiece until the harmonic frequency has stabilized. Then the computer takes the final scan automatically.