

The Proven Alternative to Thermal Stress Relief

META-LAX[®] 
The most advanced metal stress relief on the planet.



"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 in metal working applications."
- **U.S. Department of Energy**

Meta-Lax a Proven Stress Relief Alternative

How Meta-Lax Works for Stress Relief

Meta-Lax is a patented process by Bonal that relieves thermal stress within metal components by using non-destructive sub-harmonic vibrations.

All metal structures exhibit harmonic/non-harmonic behavior (**1st Scan**). The harmonic curve of a thermally stressed structure (i.e. one that was subjected to a sharp temperature drop) will have its harmonic curve out of phase from its natural frequency.

By applying mild sub-harmonic vibrational energy (which is optimum) and monitoring the response of the structure, the harmonic curve will gradually shift over (**2nd Scan**) and repeat (**3rd Scan**) when stress has been relieved. When the scans repeat stress relief is complete (**3rd Scan**)!

How Meta-Lax Works During Welding

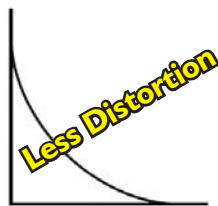
Meta-Lax vibrations are so mild they can be applied during welding (Meta-Lax Weld Conditioning) to prevent 50-90% of normal distortion and/or cracking. The gentle vibrations force the molten weld metal to stay liquid a few seconds longer thereby resulting in uniform weld solidification from the root out to the face. This new solidification pattern negates the tremendous pull that would have normally distorted the base metal.

Also, Meta-Lax weld conditioning allows more centers of freezing to occur simultaneously producing a finer weld grain structure which is crack resistant. Metallurgically, Meta-Lax weld conditioning results in increased weld ductility and impact values, 400% and 75% respectively.

Weld Profile Comparison



Weld Profile of Normal Weld

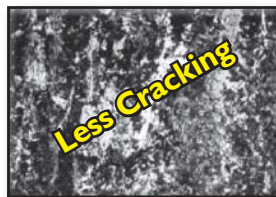


Weld Profile of MLWC Weld

A36 Photomicrographs Comparison



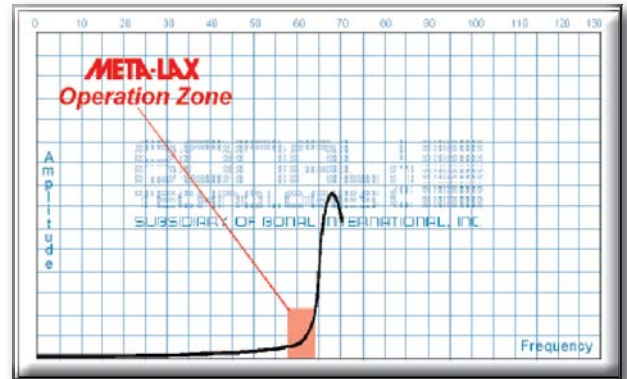
Normal Weld



Meta-Lax Weld Conditioned Weld

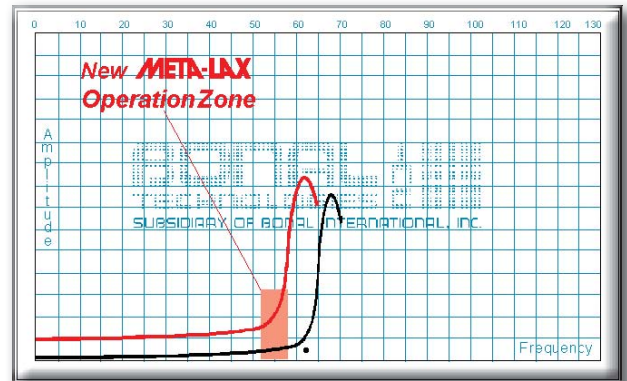
Certification: A Meta-Lax® Exclusive

Principle I - Sub-harmonic Vibration



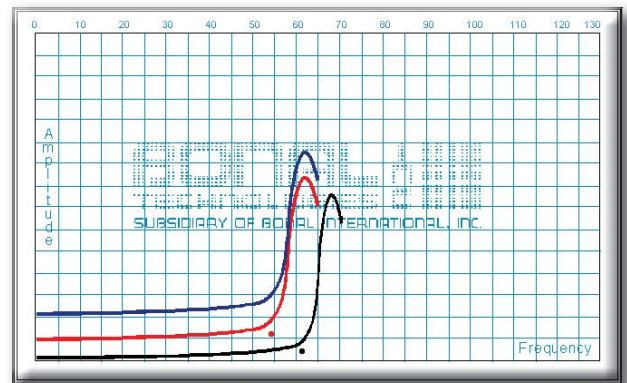
Record **1st Scan** showing initial response of workpiece and setting sub-harmonic (optimum) energy for stress relief.

Principle 2a - Curve Shifts



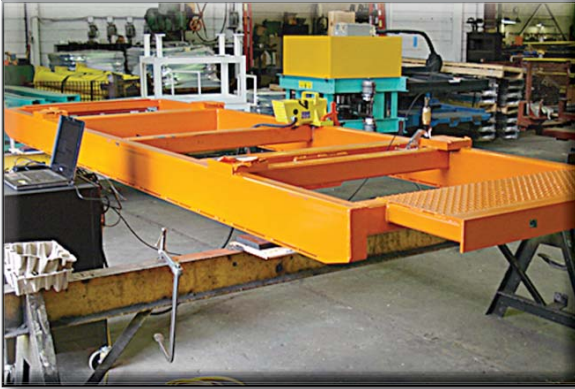
Record **2nd Scan** showing reduction of thermal stress, then adjusting for new sub-harmonic zone.

Principle 2b - Curve Repeats



Record **3rd Scan** showing scans repeat. Scans repeating is an indication that stress relief is complete. **No Guessing!**

Top Four Reasons Why Meta-Lax IS the Future of Stress Relief



1. Saves Money

Meta-Lax typically saves 50-90% the costs associated with heat treat stress relief. Average customers realize a ROI in six to nine months.



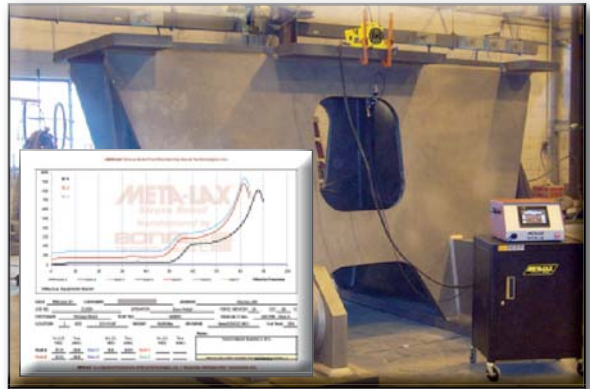
2. Saves Time

Meta-Lax is eight times faster than heat treat stress relief and typically saves 65-98% time needed for stress relief.



3. Consistent Quality

Meta-Lax is the only vibration stress relief that is as good or better than heat treat stress relief in achieving successful results on a consistent basis.



4. Certifiable

Only Meta-Lax stress relief has a unique (patented) method of certifying when stress relief has been accomplished. No Guessing!

The Meta-Lax Product Line



Model 2401 Graphic Documentation



Model 2800 Automatic Computer Controlled



Model 2001 Manual Documentation

Force Inducers & Weight Capacity



V8i

100-20,000 lbs

2Ai

150-40,000 lbs



IF

60-500 lbs



FD

120-7,000 lbs



3Ai

5,000 lbs - over

Customers Say It Best In Every Industry

Aerospace

"Since using Meta-Lax, we hold dimensional tolerances on weldments and machined parts as never before."
NASA



Automotive

"The Meta-Lax process is our preferred choice of stress relief for many reasons."
General Motors



Defense

"We saw our scrap rate go from 50% to zero and stay there."
U.S. Army



Die Casting

"I fully expect to triple the life from this die."
Airtex



High Performance

"Using the Meta-Lax system has improved the overall success of our customers."
Automotive Specialists



Machining

"We've cut the 8-12 hours processing time for several grindings down to a single operation taking only 6-8 hours."
Toyoda Machinery USA



Mining

"Since using Meta-Lax, we eliminated cracking in the last 600-700 cross tubes we made. That's unheard of in our industry."
Corrosion Engineering



Mold Making

"For us using Meta-Lax guarantees satisfied customers and a high quality product."
Beiter Moldmaking



Power Generation

"By using the Meta-Lax system for thermal stress relief, cost reduction and quality improvements have been great."
Kanawha Mfg.



Welding & Fab

"With PPAW we do less straightening and involve less labor. We know weld quality is much better with less effort."
Peninsula Metal Fab



Now It's Your Turn to Get Impressed with Meta-Lax !

