



# SONATS

Empowering Technologies



## ULTRASONIC SHOT PEENING FOR TURBINES

EMPOWERING TECHNOLOGIES is using an innovative technology (STRESSONIC®) as an alternative to Conventional Shot Peening.

### HOW IT WORKS ?

Ultrasonic Shot Peening differs from the conventional techniques by the way the kinetic energy is given to the media thrown against the metal surface to be treated by multiple impacts. Instead of using air flow or high speed turbine, STRESSONIC® is using the acceleration of a vibrating surface. The frequency of the vibration (20 KHz) is within the ultrasonic wave range, which explains the name **Ultrasonic Shot Peening**.

As the shot media are enclosed during the process within a hermetic chamber, only few grams are necessary, allowing to choose the highest media quality. STRESSONIC® process is convenient for local peening applications with no risk of media loss. Therefore, it could be used on assembled equipment (Ex : Gas Turbine, Aero Engine without or with limited dismantling).



**STRESSONIC® is the only process 100% compliant to the following specifications :**

- **BNAE - NFL 06-833** «Aerospace series - Ultrasonic shot peening for inducement of compressive surface stresses for metallic parts» May 2009
- **SAE/AMS - AMS2580** «Ultrasonically activated shot peening» May 2010
- **SAE/AMS - AMS2585** «Shot peening media, ultrasonically activated» May 2010

### PROVEN APPLICATIONS

#### Aeroengines and Turbo Chargers

**New Parts:** Blades (roots and airfoils); Blisks (IBR), Fans, Impellers; Compressor Wheels, Turbo Wheels; Bearings, Shafts, rotors; Disks (bores, sides, dovetails).

**MRO:** Blisks (IBR); Casing (welded areas); Disks, Fans (in-situ without disassembly).

#### Ground Turbines

**New Parts:** Blades (roots and airfoils); Shafts ; Bearings; Rotor wheel (bores, sides, fin tree groove); Others (gears).

**MRO:** Welded components; Disks, dovetails (in-situ without disassembly); Rotor wheel.



STRESSONIC®<sup>1</sup> and STRESSVOYAGER®<sup>2</sup> are registered trademarks in USA<sup>1</sup> and France<sup>2</sup>.

EMPOWERING TECHNOLOGIES offers different systems, from handheld **STRESSVOYAGER®**, including transportable Ruggedized **STRESSONIC®** Unit, to fully customized production floor machines.

## Performances

- Better surface finish than conventional shot peening
- Efficient treatment for complex geometry parts (ex: bore, dovetail...)
- Reduced consumption (shot media, energy, compressed air) => environmental friendly
- Different types of shot media (size and material)
- ALMEN Intensities from 4N to 10C.

## Simplicity

- IN SITU treatment
- Shorter treatment cycle without preparing the environment
  - Disassembling the surrounding elements
  - Decontaminating the peened part

## Control

- Adapted tooling and process for various applications (geometry, power and amplitude)
- Real-time control of parameters
- Guaranteed treatment repeatability
- System ensuring no loss of beads
- Safe process for the treated part

## Empowering Technologies' services

- Surface treatments services and subcontracting
- Machine design & sales
- Engineering services

## EQUIPMENTS



**STRESSVOYAGER® - Handheld solution**

Chosen by  
Alstom, GE,  
US-Army...



**Ruggedized STRESSONIC® - transportable unit for harsh conditions**



Left & right : Examples of customized machines and robotized cell for high volume production

