ELectroThermal Analysis program ELTA 6.0

ELTA 6.0, ELTA 5.5 and 2DELTA are effectives tools for design of induction processes and whole systems, research, education, etc.

Specific features of ELTA for forging application:

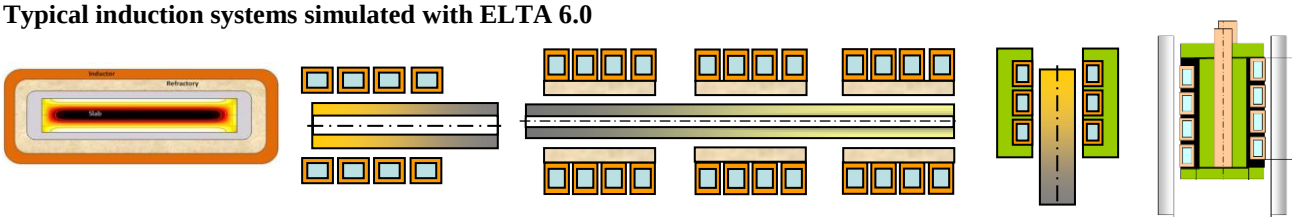
- User friendly interface with fast and accurate solver
- Coupled 1D or 2D numerical Electromagnetic + Thermal simulation of non-linear induction systems
- Multilayer parts with arbitrary initial temperature
- Axisymmetric (OD & ID) & plane-parallel geometries
- Databases with non-linear properties of materials to be heated
  Steels alloys, aluminum, copper, brass, tungsten, etc..
- Simulation of single or multi-stage heating coils
- Special module for simulation of internal coils
- Module for simulation of scanning processes
- Option of automatic frequency variation
- Multiple preinstalled Tasks and Templates
- Calculation of the coil water cooling
- Possibility to account for the power supplying circuit (buswork, capacitors, transformer)
- Automatic report generation according to selected or created templates

Features for heat treatment application:

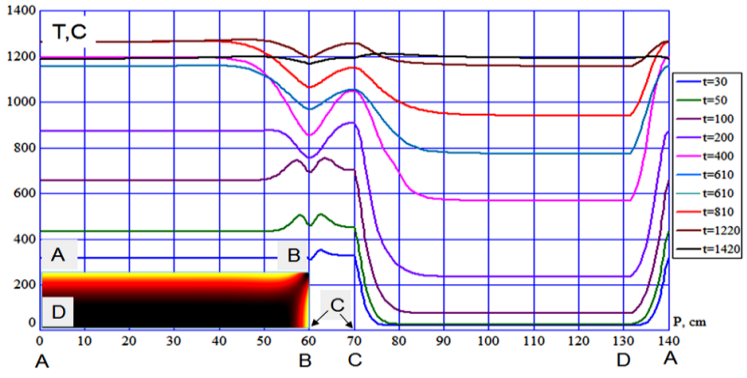
- Unique database of heat transfer coefficients for different quenching media
- Possiblity to insert TTT or CCT diagramas in Quenching graphs
- Simulation of bar heating in resistive or flame furnace
- Possibility to insert TTT or CCT diagrams in quenching graphs

For heat treatment technical bulletin please check our web site www.nsg.com or www.synergeticasp.com.br

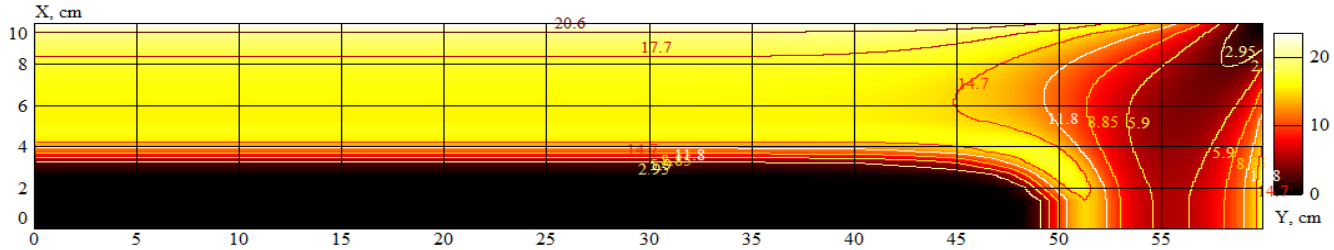
Typical induction systems simulated with ELTA 6.0



ELTA 6.0 is the same program as **ELTA 5.5** with additional block for 2D Electromagnetic and Thermal simulation of heating the bodies with rectangular cross-sections (slabs, plates, strips). A semi-analytical Total Flux method is used to count for a finite length of the system in the same way as in **ELTA 5.5**.



Temperature distribution along the perimeter of a quarter of the slab cross-section in the process of accelerated 4-stage heating of steel slab before hot rolling.



Power distribution in one quarter of slab at the end of the first stage

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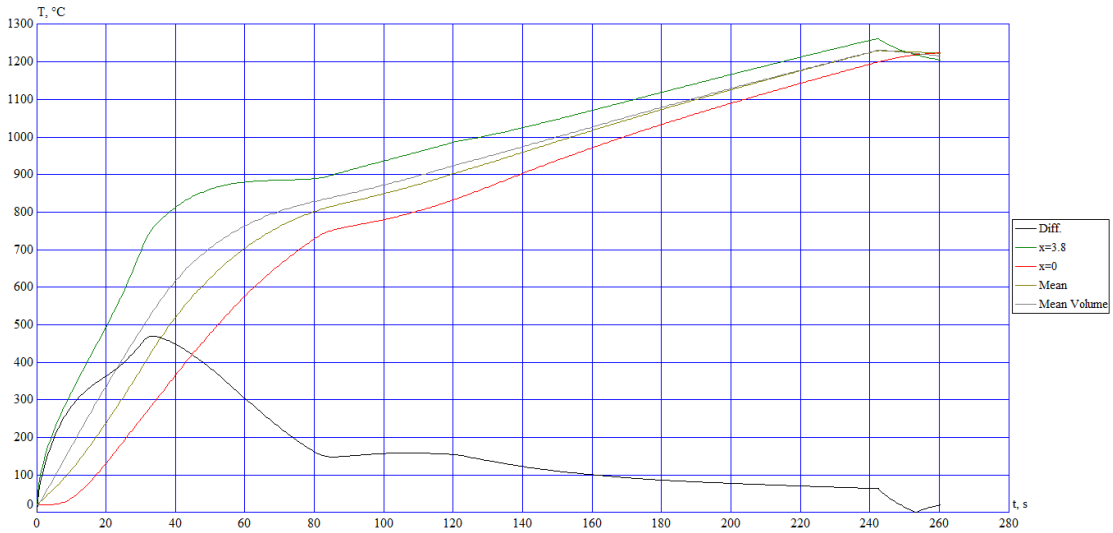
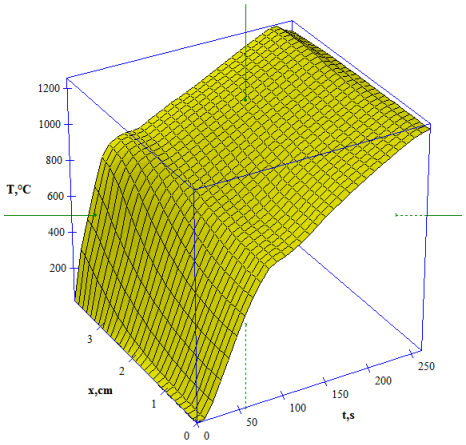
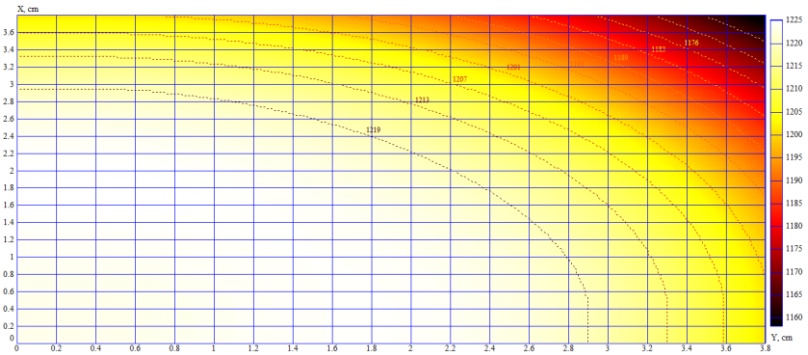


Example of practical application: Square billet heating 76x76x330mm @ 1230°C @ 3350 kg/h



Temperature vs. Time and Thickness 3D



Temperature map vs X and Y at time 262s

Tasks pre-installed in ELTA 6.0 and 5.5

1. **Example1_Fconst –** tube heating in one coil at constant frequency
2. **Example2_Fvar –** tube heating in one coil at variable frequency
3. **Furnace Heating –** bar heating in resistance or flame furnace
4. **Heattreat –** local bar end hardening with quench delay
5. **Internal 1 Turn –** internal surface heating by single-turn inductor, with magnetic core
6. **Internal 1 Turn_No Core –** hardening of internal surface by single-turn inductor, no magnetic core
7. **Internal 4 Turns –** heating for tube brazing by 4 turn inductor
8. **Massheat Periodic –** bar end heating in two inductors with different frequencies
9. **Massheat in Line –** accelerated precise heating of bar in 4 inductors to 1200 °C
10. **Scan_Hair Pin** – scan hardening of a plate by a single-turn hair-pin inductor at 100 kHz
11. **Scan_Single Turn** – scan hardening of shaft in a single turn inductor with concentrator
12. **Slab_Fe** – slab heating in line containing 3 inductors
13. **Surftreat in Line** – optimal process of bar hardening and tempering (11 stages)
14. **Tube Heating** – simulation of tube heating and transportation

Find more information about **ELTA 6.0**, **ELTA 5.5** and new program **2DELTA** on a website www.nsgsoft.com and www.synergeticasp.com.br.

Software for Induction Heating

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