

ELectroThermal Analysis program ELTA 5.5

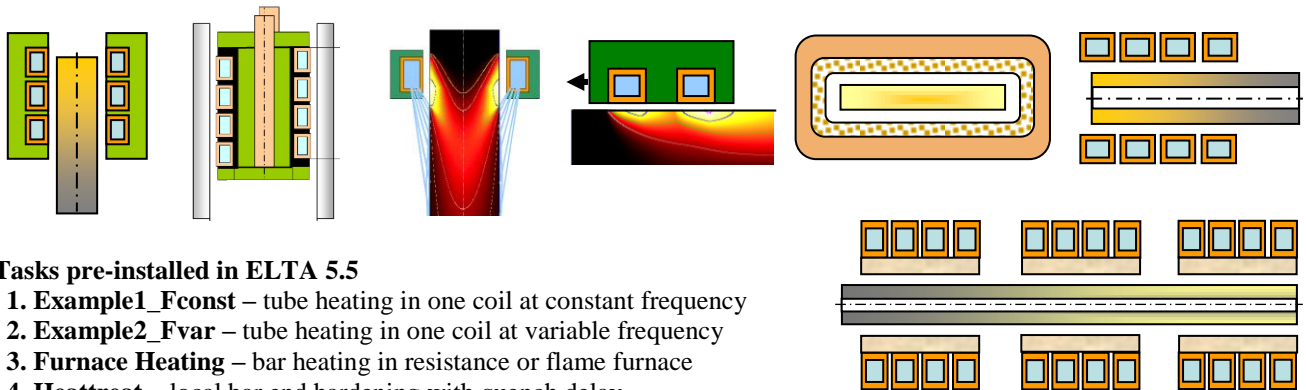
ELTA 5.5 is an effective tool for design of induction processes and whole systems, research, education, etc.

Specific features of ELTA:

- User friendly interface with fast and accurate solver
- Coupled 1D numerical Electromagnetic + Thermal simulation of non-linear induction systems
- Multilayer parts with arbitrary initial temperature
- Axisymmetric (OD & ID) & plane-parallel geometries
- Special module for simulation of internal coils
- Module for simulation of scanning processes
- Possibility to account for the power supplying circuit (buswork, capacitors, transformer)
- Databases with non-linear properties of materials to be heated
- Possibility to insert TTT or CCT diagrams in Quenching graphs
- Unique database of heat transfer coefficients for different quenching media
- Option of automatic frequency variation
- Automatic report generation according to selected or created templates
- Simulation of multi-stage processes
- Calculation of the coil water cooling
- Multiple preinstalled Tasks and Templates



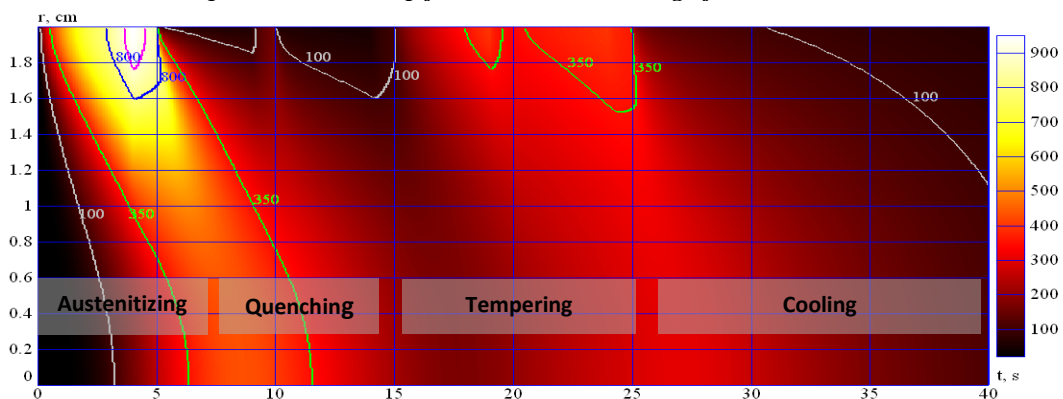
Typical induction systems simulated with ELTA 5.5

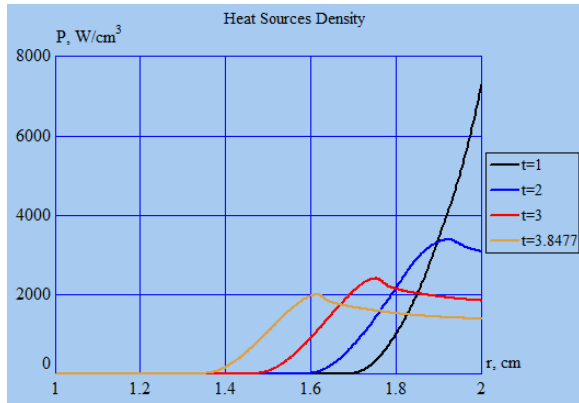


Tasks pre-installed in ELTA 5.5

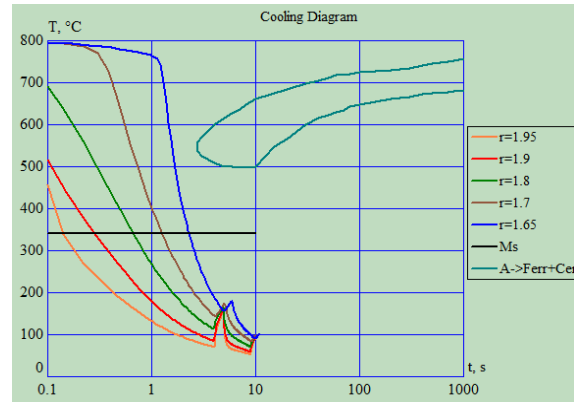
1. **Example1_Fconst** – tube heating in one coil at constant frequency
2. **Example2_Fvar** – tube heating in one coil at variable frequency
3. **Furnace Heating** – bar heating in resistance or flame furnace
4. **Heatreat** – local bar end hardening with quench delay
5. **Internal 1 Turn** – internal 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

Temperature color map for in-line heat treating of the rod end





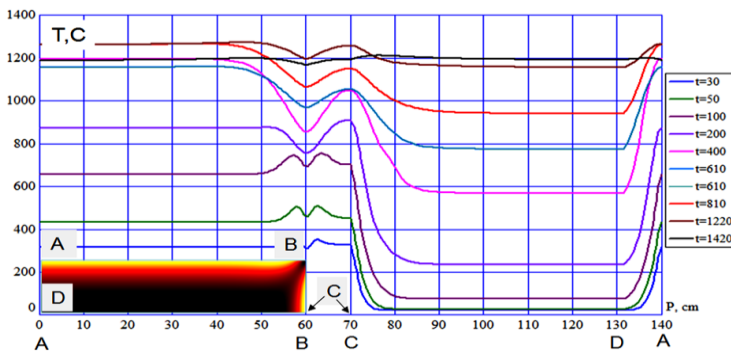
Power distribution at different instances of heating



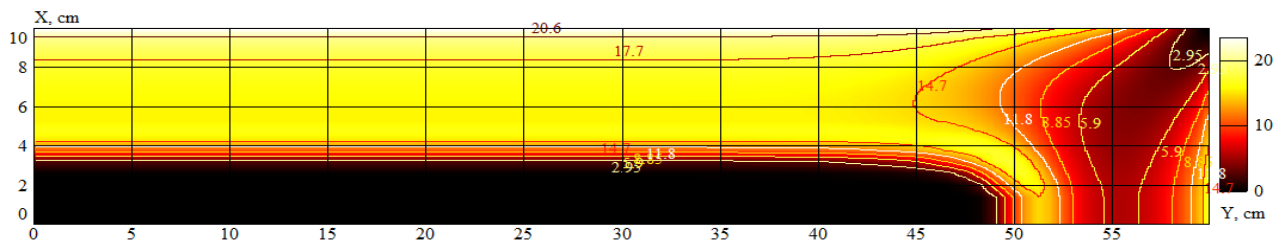
Cooling graph and CCT diagram for steel 1040

Program ELTA 6.0

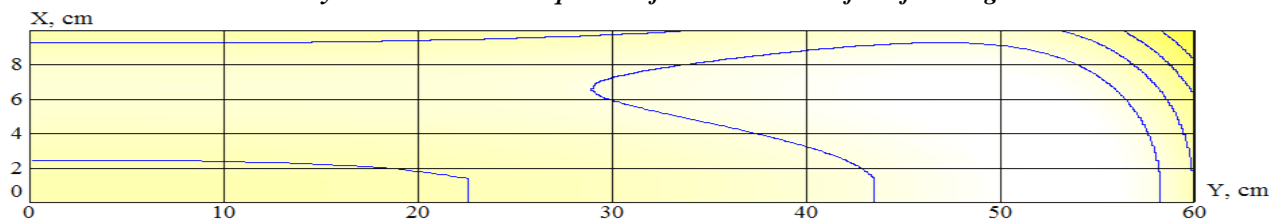
ELTA 6.0 is the same program as **ELTA 5.5** with additional block for 2D Electromagnetic and Thermal simulation of heating the bodies with rectangular cross-sections (slabs, plates, strips). A semi-analytical Total Flux method is used to count for a finite length of the system in the same way as in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



Temperature distribution in one quarter of slab at the end of the heating process ($T = 1200 \pm 25$ $^{\circ}C$)

Find more information about **ELTA 5.5**, **ELTA 6.0** and new program **2DELTA** on a website www.nsgsoft.com. Valuable information about induction heating, magnetic flux control, coil design and computer simulation may be found also on www.fluxtrol.com.



Software for Induction Heating

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