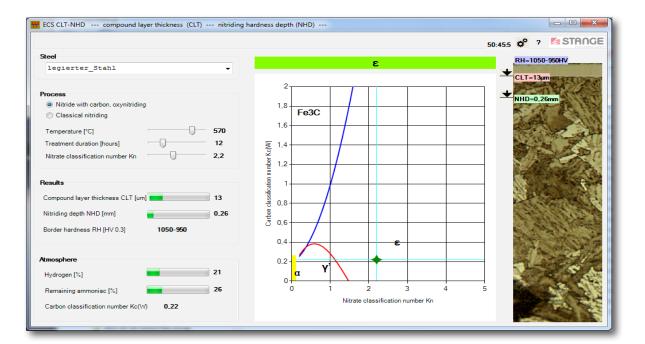


Compound Layer Module ECS CLT-NHD

Calculation of compound layer thickness, nitriding hardness depth and surface hardness _



Compound Layer Module Offline ECS CLT-NHD

A novel method for calculating the expected compound layer thickness CLT, nitriding hardness depth NHD and case hardness RH in dependence of treatment temperature, processing time and nitriding potential Kn for different nitriding processes.

The calculation is based on numerous test results with different furnaces and different batches. These test results are stored in the integrated steel data base with a maximum of 31 (at present) of the most used steel grades.

The calculation algorithm is now significantly accelerated caused by the new practical calculation basis in contrast to previous calculation programs.

This enables the immediate and automatic recalculation of each change in value and the display of the results without delay.

The major advantage for the user is to evaluate the effects immediately and thereby get a feeling for the nitriding process when changing parameters.

The calculation results are outputted for CLT and NHD as trend and value, in case of case hardness the expected range is displayed.

Atmosphere values like hydrogen content, remaining ammoniac and carburizing potential Kc(W) or the degree of dissociation are calculated and displayed depending on selected process.

The actual working point is displayed in the modified Lehrer and/or Kunze diagram depending from selected process in order to be able to consider the phase (ϵ , γ ', α , Fe₃C).

The expected layer structure is displayed as easy interpretable sectional representation.

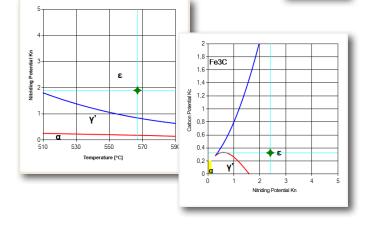




- 1) Steel grade selection
- Steel data base with the most used steel grades
- 2) Setting actual values
 - Processes classical nitriding / nitrocarburizing, oxynitriding
 - Temperature
 - Processing time
 - Nitriding potential
- 3) Calculation result display
 - Compound layer
 - Hardness depth
 - Case hardness
- 4. Atmosphere values
 - Hydrogen
 - Remaining ammoniac
 - Degree of dissociation (classical)
 - Carburizing potential (NC / Oxi)
- 5) Sectional representation
 - Schematic representation of structure, compound layer and calculated values

6) Lehrer / Kunze diagram

• With working point representation



X40CrMoV5.1	1.2344	H13-Tool-Steel
unlegierter	Stahl	
legierter S	tahl	
C10	1.0401	AISI1015
C15	1.0401	AISI1015
C20	1.0411	
C30	1.0528	
C35	1.0501	
C40	1.0511	
C45	1.0503	
CK45	1.1191	
13CrMo4	1.7131	AISI5117
16MnCr5	1.7131	AISI5117
17CrMoV10	1.7766	
18CrNi8	1.5920	
20MnCr5	1.7147	AISI5122
25CrMo4	1.7218	AISI4118/4130
30CrMoV9	1.8519	
31CrMoV9	1.8519	
32CrMo12	1.7361	
34CrA16	1.8504	Nit125

Process		
 Nitride with carbon, oxynitridin 	g	
Classical nitriding		
Temperature [°C]	O	570
Treatment duration [hours]	-0	12
Nitrate classification number Kn		2,2
Results		
Compound layer thickness CLT [ur	13	
Nitriding depth NHD [mm]		0.26
Border hardness RH [HV 0.3]	1050-950	
Atmosphere		
Hydrogen [%]		21
Remaining ammoniac [%]		26
Carbon classification number Kc(\	v) 0.22	

