

VACUUM CARBURIZING DESIGN TOOL

V-Carb is a standalone utility designed specifically for use in a heat treat shop. The utility is able to predict carbon content and case depth for a particular boost/diffuse vacuum carburizing schedule. V-Carb also has the ability to design the boost/diffuse schedule for a required case depth and surface carbon. Due to the simplicity and accuracy of V-Carb, it is a wonderful addition to any heat treat shop or process designer's toolbox.

Benefits of V-Carb

Ease of Use

Modeling physical processes can be an intimidating endeavor; enter the wrong material properties and the results can lead the user astray. With V-Carb, there is no need to enter any material properties. Enter a few processing parameters, select a material from the list of commonly vacuum carburized materials, and let V-Carb do the rest.

Boost/Diffuse Process Design

Furnace Round Up Time (Sec) 5.0
 Temperature (F) 1750.0
 Gas Partial Pressure (Torr) 1.25
 Depth of Monitor Point (in) 0.001
 0.95 % <= Monitor Point carbon <= 1.25 %
 Case Depth (in) 0.027
 Carbon at Case depth 0.58 %
 Final Surface Carbon 0.70 %
 Clear Save Close

Job description Vacuum Carburization
 Unit C F Sec Min Torr MillBar mm in
 Furnace reaction coefficient 0.75 Gas Type Acetylene Propane
 Time step size 0.015
 Chemistry C 0.20 Si 0.22 Ni 0.15 Cr 0.80 Pick Grade AISI 5120
 Mn 0.83 Mo 0.04 V 0.00 N 0.00 Al 0.00
 Job type Prediction Boost/Diffuse Schedule
 B/D Process Design B/D Process Design
 Job Manager Post-Process

Quickly and Accurately Predict or Design Boost/Diffuse Cycles

V-Carb allows the user to enter a known boost/diffuse schedule to predict the resulting carbon profile. The predictive power of V-Carb allows the user to easily compare various schedules to determine where improvements can be made. V-Carb will also design the boost/diffuse steps given a set of case depth and surface carbon requirements. This is a powerful tool given the drastic changes that can result from minor changes to the boost/diffuse steps.



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Conveniently Review the Results

With the ability to review the carbon versus depth in graphical form at the end of each boost/diffuse cycle, the user has an in-depth look at the process from one step to the next. The boost/diffuse cycle is given in tabular form for easy modification. Combine the two forms and the user can quickly alter a particular step to meet furnace time or carbon profile constraints.

B/D-NO	B/D-TIME(Min)	B/D-TEMP(F)	GAS_PRESS (MilliBar)	Boost/Diffuse
1	60.00	1755.00	1.25	Boost
2	200.00	1750.00	0.00	Diffuse
3	60.00	1750.00	1.25	Boost
4	150.00	1750.00	0.00	Diffuse
5	50.00	1750.00	1.25	Boost
6	100.00	1750.00	0.00	Diffuse
7	45.00	1750.00	1.25	Boost
8	1500.00	1750.00	0.00	Diffuse

Total Info
 Total Furnace Time: 2165.00 Min
 Total Boost Time: 215.00 Min
 Total Diffuse Time: 1950.00 Min
 R Value (diffuse/boost): 9.07

