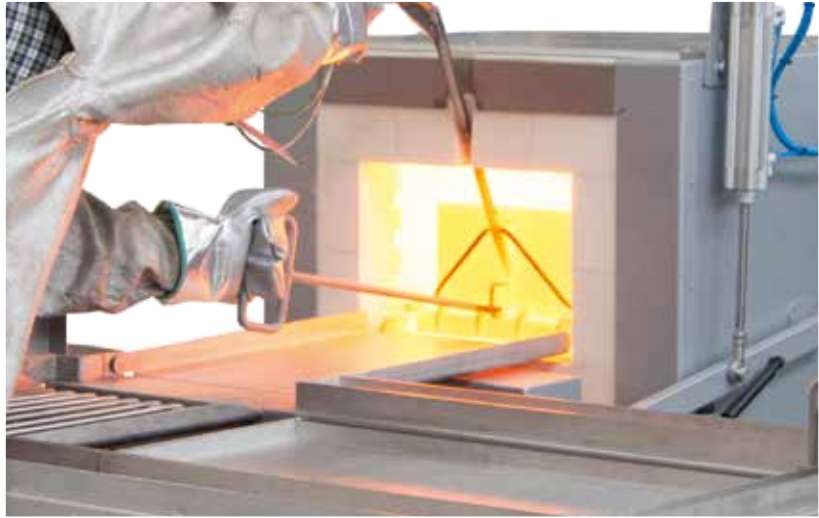


## Protective Gas and Carburization Systems for Annealing and Hardening



Annealing box



Annealing tray with alloy bag and protective gas inlet



Annealing box with protective gas inlet and outlet



Annealing box with protective gas inlet and outlet, constructed for evacuation at ambient temperatures

Our protective gas and carburization modules allow you to upgrade our chamber furnaces into a compact annealing and hardening system for non-flammable protective or reaction gases as an economical alternative to expensive vacuum systems and protective gas hardening furnaces. We can recommend different systems based on your application. Our professional test center will be pleased to test your product samples in order to specify the right heat treatment equipment for you.

### ■ Annealing Box

Our annealing boxes with lid sealing may be used for carburizing, annealing and hardening in neutral atmospheres, powder nitriding or boriding. Your charge is placed in the box and bedded in carburizing granulate, neutral annealing coal or nitriding or boriding powder. The box is sealed, and when heated, the resulting atmosphere in the closed annealing box provides for the respective surface reaction of the charge. For carburizing and similar processes, the annealing box may be removed while hot, opened and the charge quenched in fluid. For annealing processes, the box may remain in the furnace until it is cooled down.

### ■ Annealing Tray with Alloy Bag

This system, consisting of a lightweight tray with gas port and alloy bag, is particularly useful for air-quenched steels. The thin-walled annealing tray allows fast heat transfer. Its protective gas connections allow you to process your charge in a defined atmosphere. The small size of the gas lightweight tray you to pre-flush or cool the unit outside the furnace or place it on a cooling table for fast cooling by fan.

### ■ Annealing Box with Protective Gas Inlet and Outlet

The boxes are equipped with lid and protective gas inlet and outlet. The lid is sealed by means of a sealing channel with a high-temperature rope gasket before it is introduced into the furnace. The furnace is equipped with a special passage for the protective gas connections. The box is connected to a gas supply panel to introduce the required atmosphere in the box. When the heating process is finished, the box may be removed from the furnace, the lid removed and the parts quenched in liquid or air.

### ■ Annealing Box with Protective Gas Inlet and Outlet constructed for Evacuation Ambient Temperatures

This version of our annealing box is designed to be evacuated prior to the heating cycle. After evacuation, the box is refilled with a protective atmosphere for the heating cycle. This system is particularly useful for bright hardening of bulk materials, and nonferrous and noble metals, since oxygen can be more efficiently removed from the box by evacuation than through purging. Temperature-resistant seals allow this version of the annealing box to maintain a vacuum at ambient temperatures.

### ■ Additional Accessories

Nabertherm offers a wide range of hardening accessories for the a.m. heat treatment system. From the simple sealing cord for the gas supply box up to a fully automatic gas supply system, we offer interesting solutions for your problem. Please ask for our catalog Thermal Process Technology II.