

C	Si	Mn	Cr	Mo	Ni
0.38	0.40	0.65	16.0	1.00	0.80

Features and Uses

PVC is classified as a heat treatable stainless steel as it contains in excess of 12% Chromium and sufficient carbon to harden upon quenching.

It is supplied in the heat-treated condition and can be used in any application where strength coupled with corrosion resistance is required. It is particularly suited for use in the manufacture of moulds where chemically aggressive materials such as PVC and amino plastics are used.

Benefits:

- No Hardening costs
- Time saving (no waiting for heat treatment)
- Lower tool cost (e.g. no distortion to rectify)
- Modifications easily carried out
- Can be subsequently Nitrided or Tufftrided to reduce surface damage.
- Good polishing & photo etching properties.
- Fair machinability
- Uniform Hardness

PVC may be used in the following applications:

Extrusion tools for window frames
Blow moulds
Sheet moulds
Sizing tools
Hunting knives
Structural components and shafts

Heat Treatment

Annealing

Anneal preferable in a gas atmosphere at 760° / 800°C for at least 2 to 3 hours. Cool at 10°C per hour with the furnace until the temperature falls below 400°C. Withdraw from box or tube and allow cooling to shop temperature.

Stress Relieving

Where tools are heavily machined, ground or subjected to cold work, the relief of internal strains is essential before hardening. Stress relieving should be done after rough machining. To stress relieve, heat carefully to 550°C soak well and allow to cool slowly to room temperature.

Hardening

The steel should be fully soft annealed before hardening. Pre-heat to 500° / 600 °C before raising to the hardening temperature of 1020° / 1050°C. Pre heating is especially desirable for complex sections. Soak thoroughly, allowing 30 minutes per inch of ruling section before quenching.

Quenching Media

Gas or vacuum quenching is only suitable for small sections up to approximately 50 mm thick. Oil produces the desired hardness but distortion should be allowed for in the design.

Martempering

This is advised where distortion levels must be minimized. The job is quenched into a salt bath at 500° / 550 °C and held for a maximum of 10 minutes, then air-cooled.

Tempering

Temper the tool for a minimum of 2 hours as soon as it reaches 50° / 70 °C usually between 600°C and 700°C according to the requirements of the job and by reference to the tempering chart. Where possible, use a protective atmosphere or salt bath.

Nitriding and Tufftriding

Nitriding gives a very hard surface, which is resistant to wear and erosion. A Nitrided surface also increases corrosion resistance. For best results the following steps should be followed:

1. Rough Machining
2. Stress tempering
3. Grinding
4. Nitriding or Tufftriding

The following hardness should be achieved after tempering.

Temperature in °C	Surface Hardness Rockwell C
100	49-50
200	47-48
300	46-48
400	45-46
500	46-47
600	32-35
700	30-32