



ATT 2367 PLUS

CHEMICAL ANALYSIS (PERCENTAGE BY MASS)

	C	Si	Mn	Cr	Mo	V
Guide analysis	0.50	0.25	0.30	3.80	3.10	0.55

CHARACTERISTICS

ATT 2367 PLUS is a hot work tool steel with combination of improved hardness, hot wear resistance and it ensures good resistance to thermal fatigue and failures at high temperatures. ATT 2367 PLUS can be applied in plastic molds due to its good toughness in high hardness. ATT 2367 PLUS is an ESR grade which makes it easy to achieve a high level of polishability.

AISI	H13 mod
WNo.	1.2367 mod

APPLICATIONS

ATT 2367 PLUS is suitable in the following applications:

- Warm and forging dies and punches
- Complex shaped die-casting dies and inserts
- Hot shearing blades
- Long run plastic molds
- Molds with high level of polishability
- Cold work applications that demand toughness

DELIVERED CONDITION

Soft annealed to maximum hardness of 250HB.

PHYSICAL PROPERTIES

Density, kg/dm ³ at	20°C
	7.75
Thermal Conductivity (W/m.K) at	100°C
	32.0

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HEAT TREATMENT

Annealing : soft annealing should be carried out by heating between 840 and 860 °C for 2 hours followed by slow cooling at 10/20°C per hour to 650°C and then by air cooling. In this treatment, the use of protective atmosphere is important to avoid surface oxidation and decarburization.

Stress relieving : to be implemented after rough machining. Slowly heat the tool to 650°C holding time 2 hours. Furnace cool to 200°C and then freely in air.

Hardening : preheating at 600-850°C, normally in two steps. Equalize surface to center at each step. Austenitizing temperature at 1030-1050°C. This is the recommended range for all tooling obtain the best material toughness. Quenching media :

- Pressurized vacuum furnace, preferably with at least 5 bar overpressure capability or
- Warm oil, 40-70°C
- Salt or fluidized bed between 450-550°C

Tempering : Tools must be tempered immediately after hardening, as soon as they reach 50-70°C. Temper at least twice. Cool to room temperature between tempers. Always temper ATT 2367 PLUS at high temperatures, as shown in the graph below. Holding time at temperature is a minimum 2 hours. For tools larger than 70 mm, the time should be calculated based on size. Use one hour per 25mm of cross sectional thickness

Hardening and Tempering :

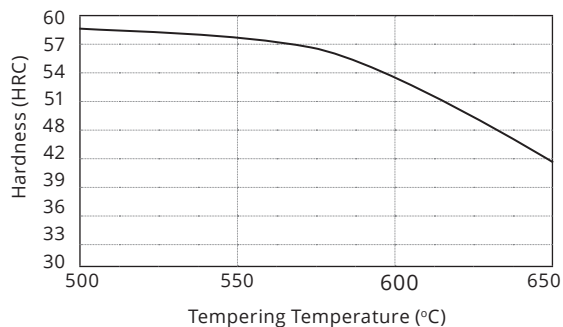
The indicated recommended hardening and tempering temperatures are	Pre-heating	Hardening	Tempering*
	600 - 850°C	1030 - 1050°C	50 - 70°C (see graph)

* For providing maximum corrosion resistance, tempering temperatures should be between 200-300°C (see graph) for hardness between 48-54 HRC.

Nitriding : Nitriding or nitrocarburizing are recommended when higher levels of surface hardness or wear resistance are required. ATT 2367 PLUS has good nitriding response. PVD or CVD coatings are also suitable to be applied on ATT 2367 PLUS if desired. It must be employed after hardening and tempering, since the temperature is at least 30°C lower than the last tempering temperature.

EDM : When Electro Discharge Machining is used, it is recommended to remove the recast layer and heat affected zone, and tempered at 50°C lower than tempering temperature for stress relief.

Tempering Curve



* Hardening at 1050°C and double tempering

Tempering Resistance Curve

