

LKM 2344 ESR

高韧性高抛光性热作钢

High Toughness and High Polishability Hot Work Steel

- 高韧性 High Toughness
- 高纯洁度 High Purity
- 高耐热疲劳性 High Thermal Fatigue Resistance
- 优越的抛光性 Excellent Polishability

LKM 2344 ESR 简介 Introduction

LKM 2344 ESR 是属于龙记特殊钢系列中的高韧性热作模具钢，参照德国 W.Nr 1.2344 标准，采用ESR（电渣重熔）冶炼技术及特殊锻打工艺，化学成分分布均匀，组织致密，具有优秀的韧性、延展性及抗热疲劳性，可用于压铸模具；LKM 2344 ESR 同时具有良好的抛光性，可用于高抛光及长寿命塑胶模具。

LKM 2344 ESR is a hot work tool steel with excellent toughness from the LKM special steel series; it is developed with reference to the German standard W. Nr 1.2344. Thanks to Electro-Slag Remelting (ESR) and specialised forging process, this material possesses homogeneous chemical composition and uniform microstructure and thus offers excellent toughness, high ductility, good heat checking resistance and high polishability; it can be used for die casting die as well as plastic injection mould with complicated mould design, high toughness and high surface finish requirement.

供货状态(原材表面硬度) Delivered Hardness From Steel Mill (Measured at Surface)

LKM 2344 ESR

退火至约 HB229 Annealed to HB229

参照标准

- Q AISI H13
- Q W.Nr 1.2344

Comparable Standard

- Q AISI H13
- Q W.Nr 1.2344

化学成分(%) Chemical Composition(Percentage by Mass)

碳 C	硅 Si	铬 Cr	锰 Mn	钼 Mo	钒 V
0.35-0.42	0.80-1.20	4.80-5.50	0.25-0.50	1.20-1.50	0.85-1.15

应用

- ✓ 压铸模具（铝、镁合金，锌合金）
- ✓ 注塑模具（添加玻璃纤维之工程塑胶模具，有光洁度要求之塑胶模具）
- ✓ 热固性塑胶压实模具

Application

- ✓ Die casting die (Aluminium, Magnesium, Zinc alloy)
- ✓ Plastic injection mould for moulding abrasive/filled materials or with high surface finish requirement
- ✓ Compression mould for moulding thermosetting polymer

物理性能 Physical Properties

温度 (°C) Temperature	20-100	20-200	20-300	20-400	20-500	20-600	20-700
热膨胀系数 [$10^{-6} \text{m}/(\text{m} \times \text{K})$] Coefficient of Thermal Expansion	10.9	11.9	12.3	12.7	13.0	13.3	13.5

温度 (°C) Temperature	20	350	700
热传导率 [W/ (m x K)] Thermal Conductivity	25.2	27.0	30.3

高纯洁度

⚠ LKM 2344 ESR 经过电渣重熔处理，钢材更加纯洁，化学成分波动范围小，组织均匀致密，材质符合北美压铸协会（NADCA）对高级热作钢的要求。

High Purity

⚠ Due to the ESR technique, LKM 2344 ESR possesses high purity, homogeneous chemical composition and uniform microstructure. LKM 2344 ESR satisfies the requirement of NADCA.

超声波检测

(☞) SEP 1921 - Test Group 3 , Class E/e

Ultrasonic Testing

(☞) SEP 1921 - Test Group 3 , Class E/e

焊接处理

- ✦ 焊前需要预热处理，预热温度：325°C
- ✦ 焊接使用专用焊枝（LKM牌号Z04-H04-XX）
- ✦ 焊后热处理工序：
 - ▶ 如在退火态焊接，焊后在850°C去应力退火
 - ▶ 如在淬硬态焊接，焊后以低于先前回火温度20-30°C作去应力处理

Welding

- ✦ Preheating temperature: 325°C
- ✦ Welding rod: LKM Z04-H04-XX
- ✦ Heat Treatment after Welding:
 - ▶ Annealed condition: Soft-anneal 850°C
 - ▶ Hardened condition: Temper at 20-30°C below the last tempering temperature

表面处理

✦ 可以通过氮化、镀铬或PVD等表面处理提高模具表面的硬度，延长模具的使用寿命

Surface Treatment

✦ Suitable for all nitriding processes, hard chromium plating and PVD coating to increase surface hardness and improve mould life.



良好抛光性

✦ LKM 2344 ESR 的抛光效果可达镜面级 (SPIA1)，适用于制作对表面加工性能要求较高的塑胶模具生产。

Good Polishability

✦ LKM2344 ESR could attain the mould finish to SPIA1, it is suitable for making through-hardened plastic injection mould requiring high surface finish.

高耐磨性

▣ LKM 2344 ESR 可以通过热处理加硬至 HRC44-52 之常用硬度，适用于添加玻璃纤维 GF、需要较高耐磨性或长寿命要求之塑胶模

High Wear Resistance

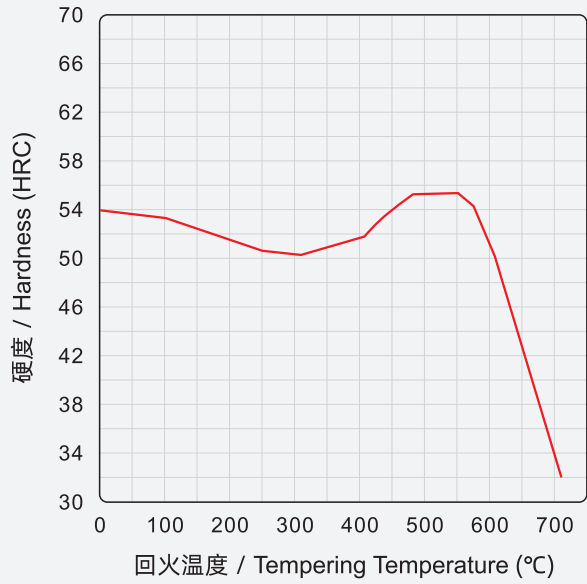
▣ The recommended working hardness of LKM 2344 ESR is HRC44-52 through heat treatment. It can be used as through-hardened plastic mould requiring high wear resistance and long production run for moulding abrasive/filled materials.

热处理工艺 Heat Treatment

锻造 Forging	软性退火 Annealing	淬硬 Quenching	回火 Tempering
1050 ~ 850°C	820 ~ 840°C	1020 ~ 1050°C	520 ~ 700°C

回火图 (试样尺寸: Ø25 × 50mm; 油淬温度: 1030°C)

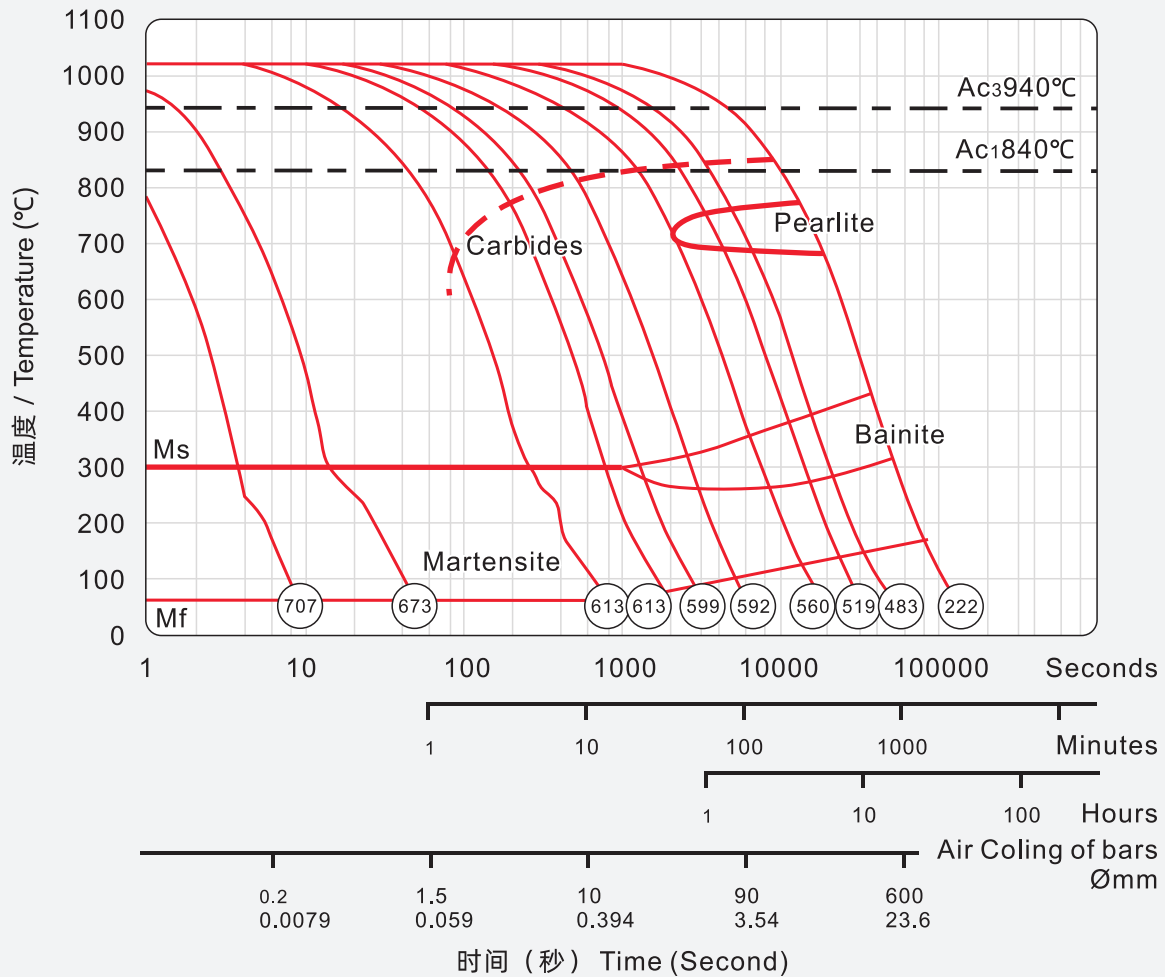
Tempering Curve (Sample dimension: Ø25x50mm; Quenched at 1030°C by Oil)



CCT图 (连续冷却转变曲线图)

CCT Diagram (Continuous Cooling Transformation Diagram)

奥氏体化温度: 1030°C Austenitizing Temperature: 1030°C



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