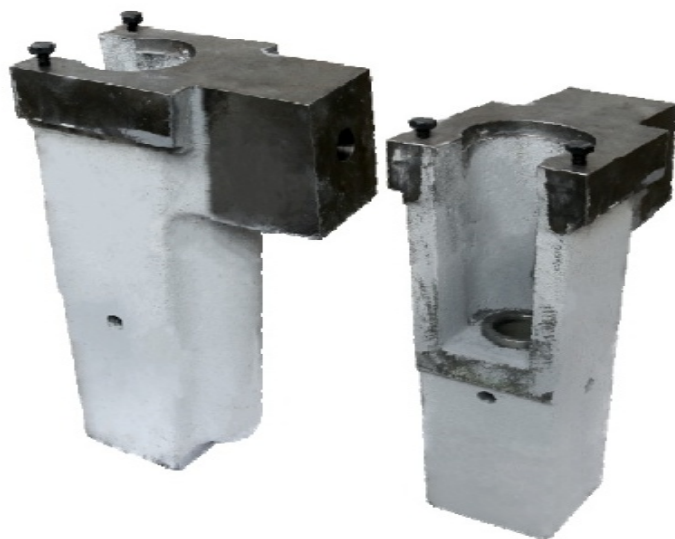




02-2-01打料壶组件



1 Product Features

- 1) Feeding pot: Based on ductile iron QT600-3, four alloying elements are added using micro-alloying principles to enhance the corrosion resistance and wear resistance of the casting.
- 2) Feeding nozzle tube: Made of 304 stainless steel, bent and pre-cast inside the feeding pot to serve as a channel for alloy molten material. It features uniform wall thickness, high strength, and is resistant to cracking.
- 3) Sprue Pin: Made of hot work steel H13, treated with high-pressure gas quenching and surface gas nitriding to ensure excellent wear resistance and fatigue strength.



02-2-01 Dosing Assembly



2 Advantages of the Hot Chamber Machine Shot Sleeve Assembly

- 1) The average service life exceeds 10 months, whereas non-LiJin products typically last only 2 to 4 months, with very few lasting beyond 6 months.
- 2) Material selection is standardized and rigorous;
- 3) Use a machining center to ensure precision and positional accuracy requirements;
- 4) The exterior of the pot is coated with imported anti-corrosion paint to extend its service life;
- 5) Higher cost-performance ratio compared to non-LiJin products.

Taking the DC88 feeding hopper as an example: Lijin's price is 2,500 yuan, while external suppliers range from 1,500 to 1,800 yuan, with a service life of 3 to 6 months. Although Lijin's hopper costs 1.5 times more than those from external suppliers, its service life exceeds that of non-Lijin products by over 2.5 times, offering excellent cost performance.





02-2-01 Feeding Pot Assembly



3 Offers various types of milk frothing pitchers, along with multiple design options for heating methods featuring a goose-neck style.



1) Heating rod type: high thermal efficiency, but requires strict environmental conditions for use;



2) Left-right heating plate type: Slightly lower thermal efficiency than the heating rod, but better than the round heating plate. However, the fixing screws remain in high temperatures for long periods, which may cause them to fuse with the mixing pot, making it difficult to remove when replacing the heating plate.



3) U-shaped heating plate: Heats from the left, right, and top sides, offering high thermal efficiency, low cost, easy installation, and overall excellent value for money.

02-2-02 Crucible (Material Pot with Zhen)



Product Features

1. High-quality material: Cast from heat-resistant cast iron with added heat and corrosion-resistant materials.
2. Perform stress-relief treatment on the casting to reduce the risk of corrosion and cracking;
3. Long service life, lasting over 6 months, with most exceeding one year or even longer (compared to industry peers' crucibles, which typically last 3–6 months).

02-2-03 Hammerhead



Product Features:

1. High-quality material: Japanese SKD61 (DAC), vacuum quenched.
2. High-quality materials and optimal heat treatment, combined with precision manufacturing, ensure the best possible product performance;
3. During design and machining, strict control is maintained over the coaxiality of the outer diameter with the internal thread and shoulder, as well as the clearance between the ejector pin and the mold core, ensuring excellent performance;
4. Long service life, lasting 6 to 8 months (some competitors intentionally increase the clearance between parts to compensate for processing defects and ensure smooth material feeding; although this may temporarily meet usage requirements, it inevitably shortens the service life).



02-2-04 Nozzle Body



Product Features

1. High-quality materials: 4Cr13, H13, SKD61, 8407.
2. Advanced processes: vacuum quenching, surface gas nitriding, and glow discharge ion nitriding.
3. The central hole is drilled through in one pass using a high-speed gun drill, with no intermediate step or joint, ensuring smoothness and effectively preventing corrosion and perforation caused by alloy fluid retention.



02-2-05射咀头



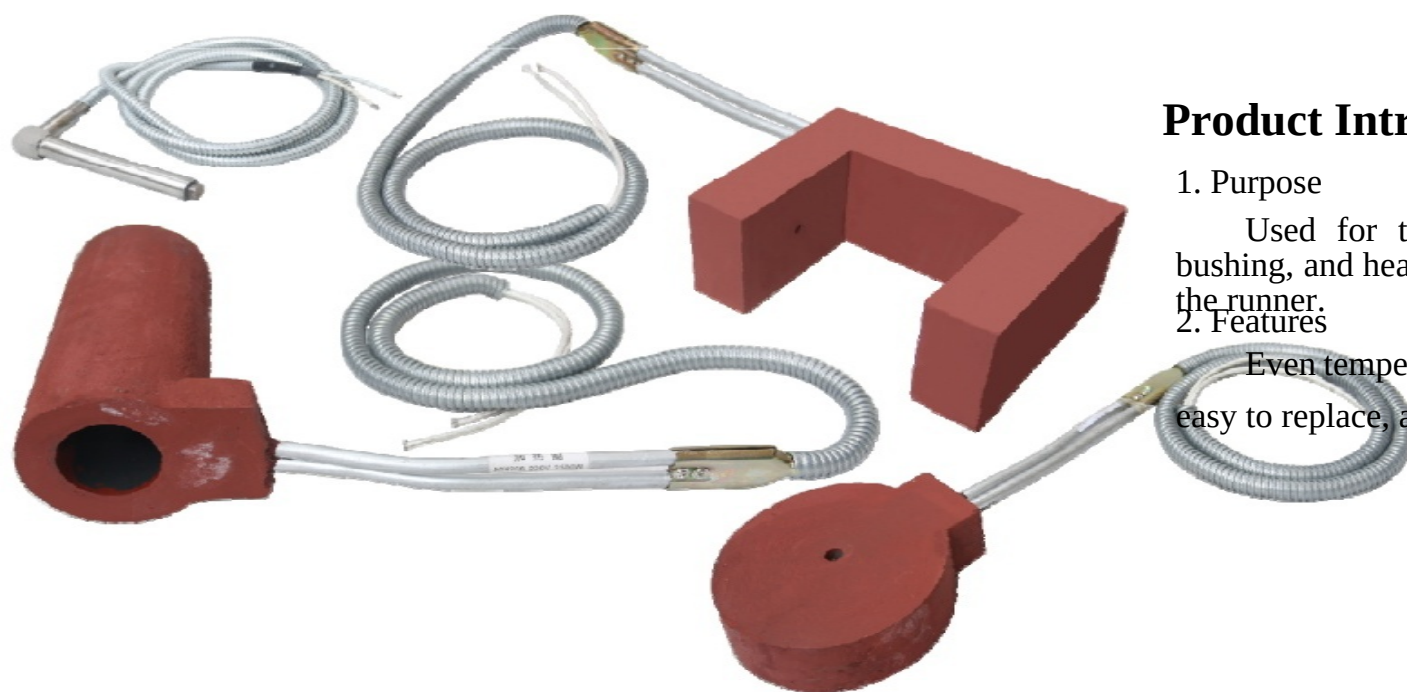
Product Features

1. Nozzle tip made of high-quality material: H13 (SKD61, 8407)
2. Precise craftsmanship: vacuum quenching combined with special heat treatment.
3. Reduced chipping and cracking.
4. Non-standard nozzle tips can be designed according to customer requirements.



Product Features

1. Steel material: H13 (Japanese SKD61 (DAC)).
2. Uses vacuum quenching, providing strong elasticity, resistance to deformation at high temperatures, and excellent wear resistance.



Product Introduction

1. Purpose

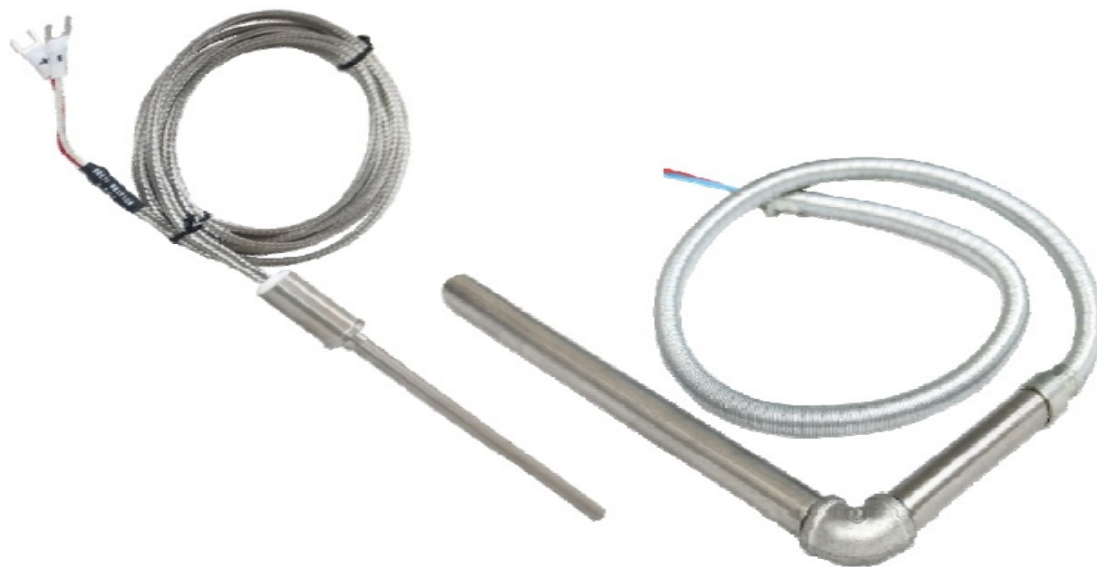
Used for the nozzle body, sprue bushing, and heating insulation sections of the runner.

2. Features

Even temperature distribution, durable, easy to replace, and high cost-effectiveness.



02-2-08测温元件



Product Introduction

1. Purpose

Used for temperature control and measurement systems in heating coils, crucible necks, crucibles, and crucible connectors.

2. Features

Accurate temperature measurement, durable, easy to replace, and high cost-performance ratio.

> 03 Cold Chamber Machine Hot Work Parts Maintenance



01 Installation and Usage
Specifications for Barrel

02 General Fault
Analysis

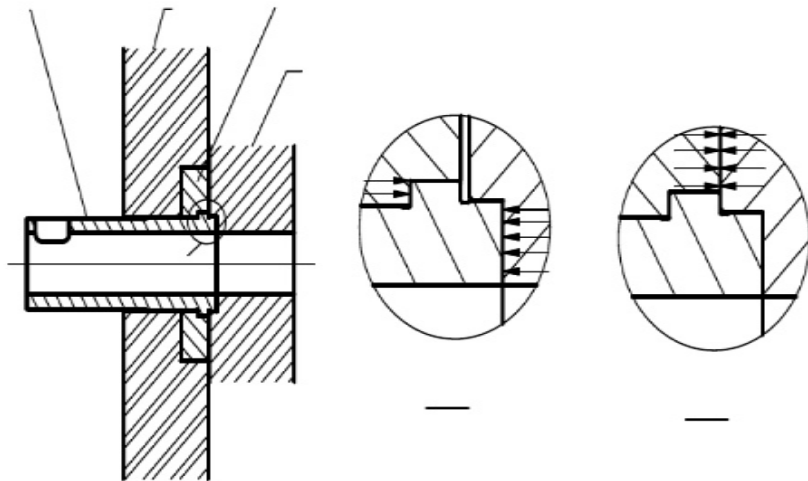
LK GROUP



03-1 Installing the Feed Barrel



1, with illustration



2 Installation Notes

- 1) Check whether the mold matches the barrel's diameter and depth (height); do not install if dimensions do not match.
- 2) Installation: The feed cylinder is assembled with the hole plate or feed cylinder gasket; the flange of the feed cylinder, which extends above the hole plate, is fitted with the mold.
- 3) Inspection: Check for any gaps between the top plate and the mold; there must be no steps or gaps between the feed cylinder and the inner hole of the mold sprue bushing.
- 4) Fixation: Ensure the feed cylinder fits tightly with the fixed mold, and prevent the feed cylinder from rotating.



03-2 Feeding Cylinder Usage Guidelines A



1. During installation, check whether the diameter and depth of the mold inlet hole match the inner diameter of the feed cylinder and the height of the feed cylinder flange protruding from the forming plate (head plate). Ensure that the mold fits completely against the head plate. It is strictly prohibited for the protruding part of the feed cylinder flange to exceed the depth of the mold stop mouth!
2. Standard feeding sleeves are suitable only for aluminum and magnesium alloy products with a material temperature between 600°C and 720°C. For other alloy products requiring higher operating temperatures, special custom designs are needed. Whenever possible, the lowest material temperature that meets product requirements should be used. For example, the typical material temperature for die-cast aluminum alloy products is generally 620–650°C.
3. Ensure that the inner diameter of the mold cavity (the inner diameter of the sprue bushing) matches the inner diameter of the feed cylinder. If the feed cylinder is ϕD , the mold cavity must be controlled within $\phi D^{+0.05}_0$. At the same time, during installation, ensure that the inner diameter of the feed cylinder and the inner diameter of the mold are coaxial to avoid misalignment or step formation.
4. The center of the shot pin must align with the center of the barrel, with a deviation generally controlled within 0.20 mm. At the same time, the centers of the plunger and hammer handle joint must coincide with the shot center.





03-2 Feeding Cylinder Usage Guidelines B



5. During the use of the feed cylinder, maintain good lubrication at the material inlet.
6. The plunger must be properly cooled with circulating water, and leakage is strictly prohibited at the joint between the plunger and the hammer handle.
7. After feeding is completed, it is prohibited to spray mold release agents (except for normal air blowing) or water-soluble substances into the feed hopper inlet.
8. Use a plunger with tolerance matching; replace it promptly if severe unilateral wear occurs. At the same time, check whether the outer circumference and inner bore shoulder of the plunger are concentric, or realign the shot pin center to prevent scratching the inner wall of the barrel.
9. When moving the feed cylinder, handle it gently to avoid damage. In particular, the discharge end of the feed cylinder must not be damaged!





03-2 Feeding Cylinder Usage Specifications C



10. Comparison of Aluminum Alloy Grades Domestic and International

Commonly used die-casting aluminum alloy grades are AD12 and A380, both of which are aluminum-silicon-copper series die-casting aluminum alloys.

合金系列	中国 GB/T 15115—2009	美国 ASTM B 179—06	日本 JIS H 2118:2006	欧洲 EN 1676:1997
Al-Si 系	YL102	A413.1	AD1.1	EN AB-47100
Al-Si-Mg 系	YL101	A360.1	AD3.1	EN AB-43400
	YL104	360.2	—	—
Al-Si-Cu 系	YL112	A380.1	AD10.1	EN AB-46200
	YL113	383.1	AD12.1	EN AB-46100
	YL117	B390.1	AD14.1	—
Al-Mg 系	YL302	518.1	—	—
Al-Si-Cu 系	YL112	A380.1	AD10.1	EN AB-46200
	YL113	383.1	AD12.1	EN AB-46100
	YL117	B390.1	AD14.1	—
Al-Mg 系	YL302	518.1	—	—



11. Chemical composition of die-cast aluminum alloy

The effective elements in die-cast aluminum alloys are silicon, magnesium, copper, zinc, etc., which function as follows; all other elements are considered impurities and must be controlled to low levels. Excessive impurities can increase corrosion resistance, degrade casting performance, and thereby shorten the service life of hot-work components.

Table 1 Chemical Composition of Cast Aluminum Alloy

Serial Number	Alloy grade	Alloy code	Chemical composition (mass fraction) / %										
			Si	Cu	Mn	Mg	Fe	Ni	Ti	Zn	Pb	Sn	Al
1	YZAlSi10Mg	YL101	9.0 10.0	0.6	< 0.35	0.45 0.65	1.0	< 0.50	—	<0.40	0.10	<0.15	Margin
2	YZAlSi12	YL102	10.0 13.0	0.0	< 0.35	< 0.10	< 1.0	< 0.50	—	0.40	< 0.10	< 0.15	Margin of error
3	YZAlSi10	YL104	8.0 10.5	0.3	0	0.30~ 0.50	0.50, 8	10	—	≤0.30	<0.05	<0.01	Margin of error
4	YZAlSi9Cu4	YL112	7.5 2.6	3.0 4.9	0.50	< 0.10	< 1.0	< 0.50	—	≤2.90	≤0.10	≤0.15	Margin of Error
5	YZAlSi1Cu3	YL117	9 2.0	Heart 3.0	0.50	< 0.10	< 1.0	< 0.30	—	290	0.10	—	Margin
6	YZAlSi17Cu5Mg .117		0 to 4.0 18.0	5.0	60.50	0.50 0.70	<1.0	<0.10	<0.20	<1.40	<0.10	—	Margin
7	YZAlMg5Si1		0.350.25	0.35	7.60 8.60	1.1	0.15	—	-0.15	0.10	< 0.15	Margin of error	

Note: Except for the mandatory inspection elements such as range values and missing values, other elements will be randomly inspected when required.



03-2 Feeding Cylinder Usage Guidelines E



12. The Influence of Die-Casting Aluminum Alloy Composition

Silicon: Aluminum alloys containing 11.7% silicon form an eutectic microstructure, providing the best fluidity of molten alloy. High-silicon aluminum alloys exhibit significant high-temperature erosion on feed barrels and crucibles; as silicon content increases, the hardness and strength of the aluminum alloy increase, while ductility decreases and brittleness increases.

Copper: Typically contains 1.5–3.5% copper. Increasing the content improves the alloy's fluidity, hardness, and strength, enhances wear resistance, but reduces corrosion resistance and ductility, while increasing the tendency for hot cracking; excessively high content raises the alloy's melting point.

Magnesium: Typically present at 0.2–0.3%, it enhances alloy strength and yield limit, and improves machinability; however, excessive content deteriorates casting properties. **Zinc:**

Zinc improves the fluidity of molten alloy and casting performance; but zinc readily reacts with iron to form iron-zinc compounds, so high zinc content may lead to adverse effects.

It increases the rate of high-temperature dissolution (i.e., corrosion), so the content should be controlled below 1%.

Iron, titanium, and arsenic: these impurities reduce the fluidity of the alloy melt and increase its corrosiveness; therefore, lower impurity content is always preferable. Due to aluminum's interaction with the mold

It has strong adhesion, especially when the iron content is below 0.6%, so controlling the iron content within the range of 0.6–1% will be beneficial.

Controlling the adhesion of the alloy melt is beneficial for extending the service life of the feeding cylinder.



13. Properties and Other Characteristics of Die-Cast Aluminum Alloys

- 1) When the silicon content exceeds 12%, the alloy's corrosion resistance is significantly enhanced;
- 2) The worse the non-stick property, the stronger the adhesion, and the poorer the casting performance.

合金牌号	YZAlSi10Mg	YZAlSi12	YZAlSi10	YZAlSi9Cu4	YZAlSi11Cu3	YZAlSi17Cu5Mg	YZAlMg5Si1
合金代号	YL101	YL102	YL104	YL112	YL113	YL117	YL302
抗热裂性	1	1	1	2	1	4	5
致密性	2	1	2	2	2	4	5
充型能力	3	1	3	2	1	1	5
不粘型性	2	1	1	1	2	2	5
耐蚀性	2	2	1	4	3	3	1
加工性	3	4	3	3	2	5	1
抛光性	3	5	3	3	3	5	1
电镀性	2	3	2	1	1	3	5
阳极处理	3	5	3	3	3	5	1
氧化保护层	3	3	3	4	4	5	1
高温强度	1	3	1	3	2	3	4

注：1 表示最佳，5 表示最差。



03-3 Analysis of Common Failures in Hot Work Components of Cold Chamber Machines



1, card hammer

- 1) Check the inner wall of the barrel for corrosion or material buildup. If corrosion is found, replace the barrel;
- 2) Check whether the cooling water for the plunger is functioning properly;
- 3) Is the outer diameter of the plunger oversized (or has the hammer head worn severely without timely replacement)?
- 4) Check whether the thread stop shoulder of the plunger and the outer circle are concentric;
- 5) If all the above conditions are normal, then the material feeding center needs to be adjusted.





03-3 Analysis of Common Failures in Hot Work Components of Cold Chamber Machines



2, corrosion at the feed hopper nozzle

- 1) Excessive usage time, reaching the end of its service life;
- 2) Check whether the temperature of the aluminum alloy melt in the furnace is too high or if the alloy composition is abnormal;
- 3) Check whether there is any leakage at the joint between the plunger and the hammer handle;
- 4) Whether to spray release agent at the pouring port;
- 5) Otherwise, please contact our customer service personnel promptly for assistance.

3, scratch on the feed barrel

- 1) Check whether the threaded shoulder of the plunger and its outer circumference are concentric;
- 2) Check whether the cooling water for the plunger is functioning properly;
- 3) Check whether the outer diameter and surface hardness of the plunger meet the requirements for use in the barrel;
- 4) Scratches at the outlet end of the sprue bushing; check whether the inner diameter of the mold cavity (inner diameter of the gate bushing) matches or is concentric with the inner diameter of the sprue bushing.
- 5) If all the above conditions are normal, then the material feeding center needs to be adjusted.



03-3 Analysis of Common Failures in Hot Work Components of Cold Chamber Machines



4, feed barrel flange breakage

- 1) Excessive usage time, reaching the end of its service life;
- 2) Check whether the mold is fully in contact with the top plate; gaps are strictly prohibited.
- 3) Whether frequent hammer jamming occurs; or whether the operator handles hammer jamming in a non-standard manner;
- 4) Otherwise, please contact our customer service department for resolution.

5, barrel cracking

Contact our customer service department promptly and bring the sample back to our company for testing and analysis.





03-3 Analysis of Common Failures in Hot Work Components of Cold Chamber Machines



6, ejector pin scratch

- 1) Is there any scratch, corrosion, or material adhesion inside the barrel bore?
- 2) Condition of the smoothness and roundness of the nozzle inlet, sprue bushing, and plunger outer surface;
- 3) Is the plunger cooling adequate?
- 4) If all the above conditions are normal, then the material feeding center needs to be adjusted.

7, ejector pin cracking

Contact our customer service department promptly and bring the sample back to our company for testing and analysis.





04热室机热作件保养维护



Product Installation Guidelines



Product Usage Guidelines



Daily Use and Maintenance

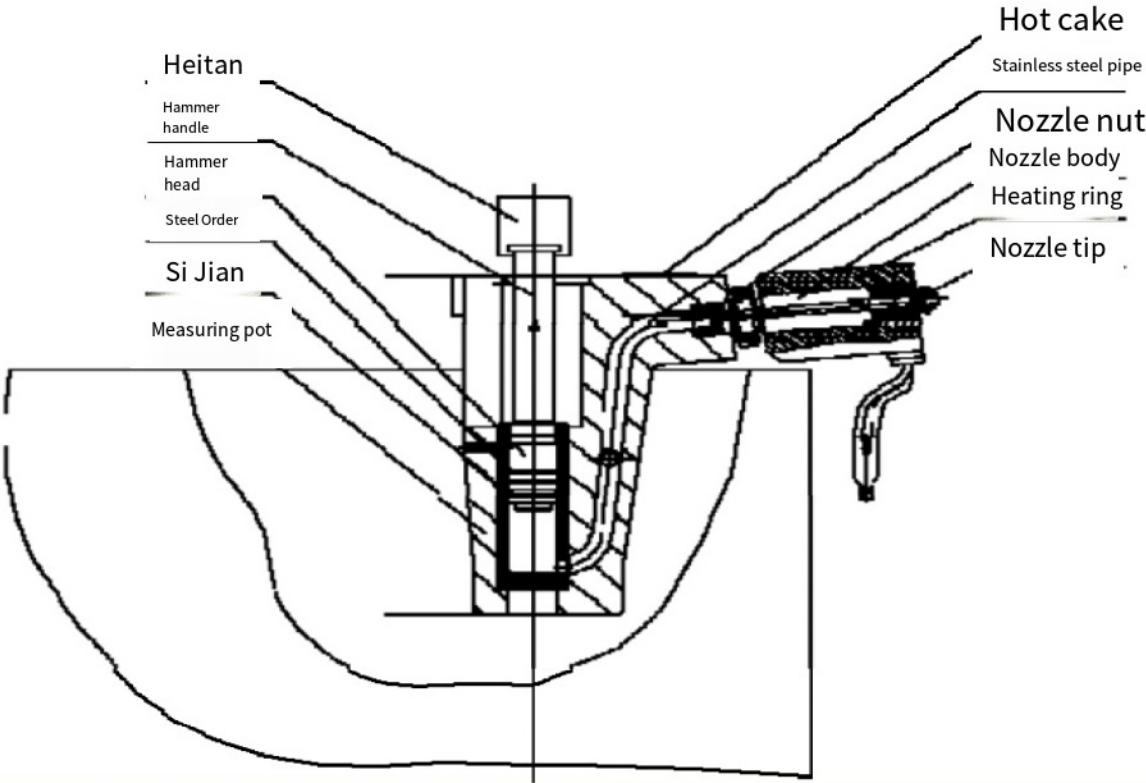


General Troubleshooting



>>> 04-1 Hot Chamber Machine Product Installation Specification

04-1-01 Hot Chamber Machine Feeding Component Assembly Diagram





04-1 Hot Chamber Machine Product Installation Specifications

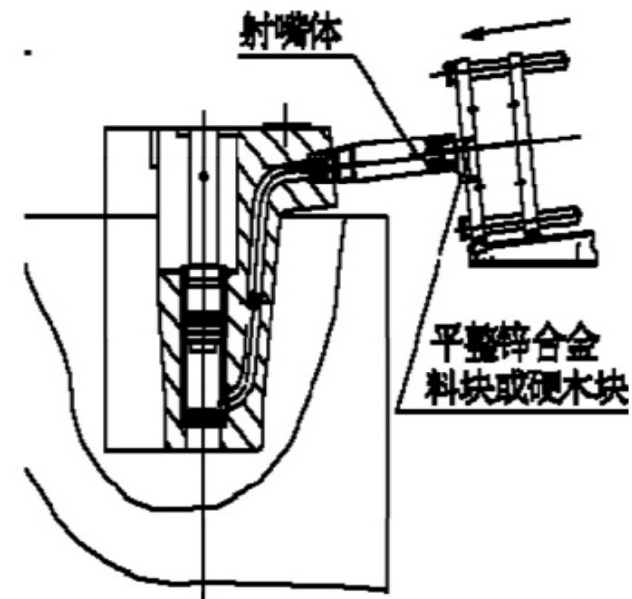
04-1-02 Nozzle Body Installation Specification



Installation Steps

- 1) Check whether the nozzle taper matches the sprue bushing taper. Verify that the nozzle body is aligned with the mold plate center (the deviation must not exceed 0.3 mm).
- 2) Heat the goose neck to approximately 450°C, apply high-temperature resistant oil to the tapered section of the nozzle body, ensuring a perfect fit with the tapered opening of the goose neck.
- 3) Place a flat zinc alloy block or a hard wooden block between the nozzle body and the front plate. First, use spot operation to move the mold system forward by pressing the front and rear buttons, thereby pushing the nozzle body into the goose neck. Then, press the front button, adjust the temperature to 410°C, and hold for three minutes before removing the alloy block or wooden block.

Schematic diagram of nozzle body installation





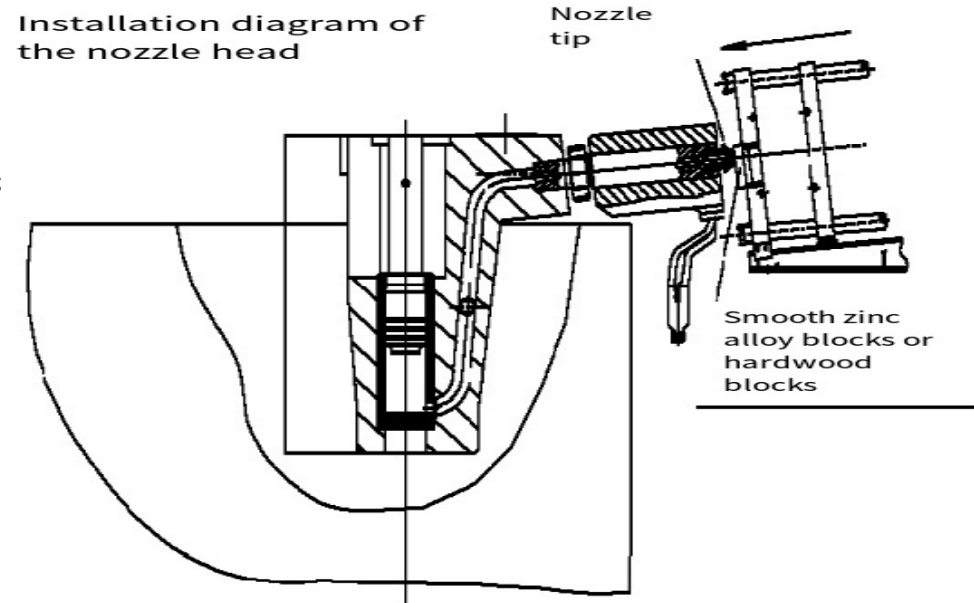
04-1 Hot Chamber Machine Product Installation Specification

04-1-03 Nozzle Installation Specification



Nozzle Installation Steps

- 1) Heat the heating band to 450°C; apply a layer of high-temperature lubricant to the nozzle tip cone surface.
- 2) Insert the nozzle tip into the conical hole of the nozzle body;
- 3) Place a flat zinc alloy block (or a hard wooden block) against the end face of the hole in the mold plate. Operate the machine to perform the pre-clamping motion, pressing the nozzle tip firmly into the conical hole of the nozzle body. Cool the heating ring to 410°C and maintain the working pressure for three minutes before clamping to securely seat the nozzle tip.
- 4) After the clamping operation, remove the zinc alloy block (or hardwood).





04-1热室机产品安装规范



04-1-04钢令安装规范

1) Steel wire clips must be installed using a steel wire clip pliers. Do not over-expand the opening of the clip—only open it enough to fit the wire size. Excessive expansion may cause elastic deformation, making the clip irreparable and rendering it ineffective.

2) First, install the center steel pin.

3) The three steel rods must be properly installed and able to rotate freely.





04-1 Hot Chamber Machine Product Installation Specification

04-1-05 Punch Piston Rod Installation Specification



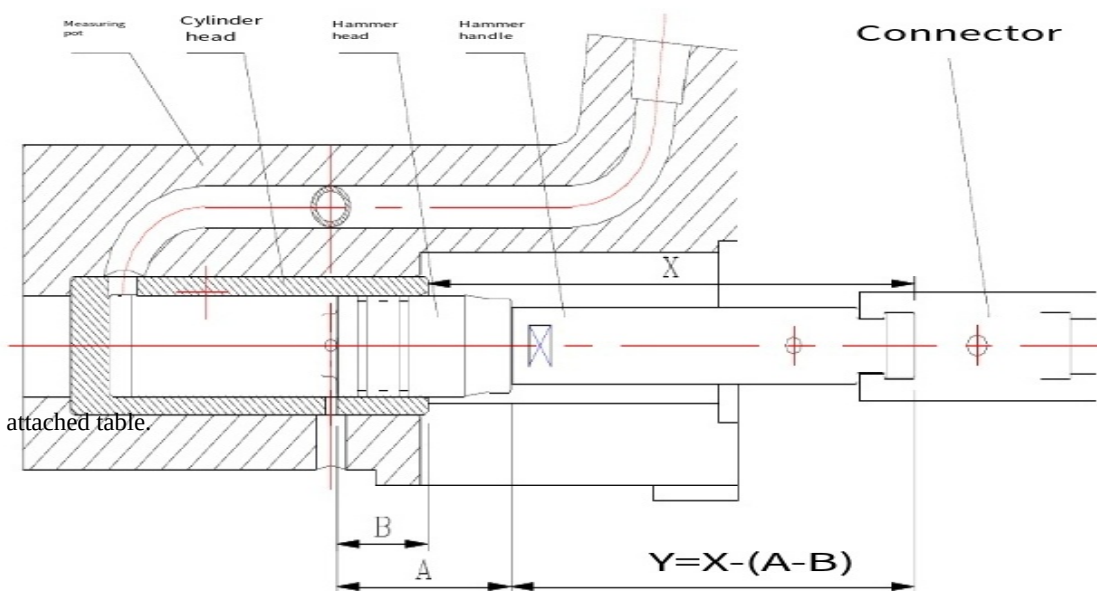
Calculate the hammer handle length

1) Due to deviations in the position of the pot inlet hole during casting, the dimensions between each pot pin and the pot mounting surface vary slightly. Therefore, when replacing a pot or pot pin, the length of the hammer handle should be rechecked. The formula for calculating the hammer handle length is as follows:

$$\text{DC88 } Y = X - 50\text{mm}$$

Y is the machining length of the hammer handle; X is the actual measured value.

2) Specific data shall be implemented in accordance with the attached table.





04-1热室机产品安装规范



04-1-05冲头活塞杆安装规范

Appendix: Hot Chamber Machine Calculation of Hammer Handle Length

The length of the hot chamber machine punch rod (hammer handle) is determined on-site. To standardize measurement and calculation methods, when measuring the actual hammer handle length, first measure the distance from the upper surface of the recessed groove in the half-side hammer clamp to the sprue bushing as the measured value "X" (as shown in the figure). The calculated value "Y" obtained by substituting into the formula will be the hammer handle length. The previous technical notice dated 2006-7-18-01 is hereby canceled. Specifications for hammer heads and calculation formulas for hammer handle lengths for various machine models are detailed in the new table below:

Model		DC8	DC12	DC18		DC30	DC50, DC88	DC100	DC130	DC160	DC200	DC280		DC400
Hammer Head Straight Path	Standard	F30	F30		F36	F40	F50	F55	F60	F65	F70		F80	F80
	Alternative	F32	F36	F30	F40	F36 F45	F45 F55	F60	F65	F60 F70	F60 F65	F70		F70 F90
Formula		$Y = X - 19.5$	$Y = X - 17$	$Y = X - 7$	$Y = X - 17$	$Y = X - 18$	$Y = X - 49$	$Y = X - 44$	$Y = X - 56$	$Y = X - 56$	$Y = X - 54$	$Y = X - 54$	$Y = X - 46$	$Y = X - 36$

Note: The determination of positional dimensions is based on the specifications of commonly used injection plungers.



04-2 Hot Chamber Machine Product Usage Guidelines



The goose neck section of the hopper must be heated by a heating rod or heating plate. During normal machine operation, use the heating rod to maintain a temperature of 420°C; with plate heating, the maximum temperature should reach up to 450°C, ensuring that the goose neck operates normally during material discharge.

- 2) The heating ring size must match the nozzle body, and the operating temperature should be controlled within the range of 400–430°C, with a maximum allowable temperature of 450°C.
- 3) The nozzle diameter of the mold gate should match and be aligned with the sprue bushing outlet diameter, and the mold gate diameter should be 0.5 mm larger than the sprue bushing diameter.
- 4) Maintain the temperature of the zinc alloy melt in the crucible between 410 and 430°C, and keep the heating zone temperature of the sprue body within the same range.
- 5) The nozzle outlet diameter must be properly matched according to requirements; the taper between the nozzle tip and the nozzle body must fit precisely and align correctly. Install according to specifications, and strictly prohibit overheating with a torch.
- 6) When installing the steel pin, do not overopen the steel pin pliers to prevent excessive elasticity from causing the pin to lose its resilience. When removing the steel pin, avoid using a screwdriver to pry it out to prevent chipping or cracking of the pin groove.



111 04-2 Hot Chamber Machine Product Usage Specification

7) The composition of die-cast zinc alloy must comply with the requirements of GB/T 13818-92.

	Zamak 2	Zamak 3	Zamak 5	ZA8	Superloy	AcuZinc 5
Aluminum	3.8 to 4.3	3.8 to 4.3	3.8 to 4.3	8.2 ~ 8.8	6.6 ~ 7.2	2.8 to 3.3
Copper	2.7 to 3.3	0.030	0.7 to 1.1	0.9 ~ 1.3	3.2 - 3.8	5.0 to 6.0
Magnesium	0.035 ~ 0.06	0.035 ~ 0.06	0.035 ~ 0.06	0.02 ~ 0.035	0.005	0.025 ~ 0.05
Iron	0.020	0.020	0.020	0.035	0.020	0.075
Lead	0.003	0.003	0.003	0.005	0.003	0.005
Cadmium	0.003	0.003	0.003	0.005	0.003	0.004
Tin	0.001	0.001	0.001	0.001	0.001	0.003
Zinc	Margin	Margin	Margin	Margin	Margin	Margin



04-2 Hot Chamber Machine Product Usage Guidelines



8) The Role of Each Element in Die-Cast Zinc Alloys

Aluminum: 1) Improves the casting properties of the alloy, enhances fluidity—optimal fluidity is achieved at 0% and 5%, refines grain structure, induces solid solution strengthening, and improves mechanical properties. 2) Reduces zinc's reactivity with iron, minimizing erosion of iron-based materials such as goosenecks, molds, and crucibles. The aluminum content should be controlled between 3.8% and 4.3%. This range is primarily determined by the required strength and fluidity, as good fluidity ensures the production of complete, dimensionally accurate, and surface-quality castings.

Smooth casting requires certain conditions. The adverse effect of aluminum in zinc alloys is the formation of Fe-Al slag, which leads to a reduction in its content.

Copper: 1) increases the hardness and strength of the alloy; 2) improves the alloy's wear resistance; 3) reduces intergranular corrosion.

Magnesium: 1) reduces intergranular corrosion; 2) refines the alloy microstructure, thereby increasing the alloy's strength; 3) improves the alloy's wear resistance; 4)

When the magnesium content exceeds 0.08%, it causes hot brittleness, reduced toughness, and decreased fluidity; 5) It is prone to oxidation loss in the molten state of the alloy. The effect of magnesium on the fluidity of the alloy.

04-2 Hot Chamber Machine Product Usage Guidelines



8) The Role of Each Element in Die-Cast Zinc Alloys

Lead, cadmium, and tin: all are impurity elements that make intergranular corrosion of zinc alloys highly sensitive. After storage at room temperature for a period of time (eight weeks to several months), surface blistering occurs.

Iron: 1) Reacts with aluminum to form the intermetallic compound Al_5Fe_2 , resulting in aluminum loss and dross formation; 2) Creates hard spots in die-cast parts, affecting subsequent machining and polishing; 3) Increases alloy brittleness; 4) The solubility of iron in molten zinc increases with rising temperature. Every change in furnace temperature causes either supersaturation (when cooling) or undersaturation (when heating) of iron. When iron becomes supersaturated, the excess iron reacts with aluminum in the alloy, leading to increased dross formation. When iron is undersaturated, corrosion of the crucible and gooseneck materials by the alloy intensifies as it attempts to return to saturation. Both temperature changes ultimately result in aluminum consumption and increased dross generation.



04-3 Hot Chamber Machine Product Daily Use and Maintenance



Daily Maintenance Guidelines Part One

- 1) Before using the material pot, NC8 anti-acid coating must be applied to the surface of the casting to prevent corrosion. ◦
- 2) Maintain the temperature of the zinc alloy material in the crucible between 410°C and 430°C. Excessive temperature will sharply increase the corrosiveness of the molten zinc alloy, leading to corrosion of the pot body and core pin, jamming the shot sleeve, and reducing the service life of the pot.
- 3) Check the furnace thermocouple every two weeks. Remove the thermocouple, clean its surface, and inspect for corrosion. Replace it immediately if any corrosion is found.
- 4) Promptly remove alloy dross from the surface of the zinc alloy melt in the crucible. Once dross enters the pot sleeve, it may scratch the steel rod, plunger, and pot sleeve, and in severe cases, cause the plunger to jam.
- 5) Add alloy material promptly to maintain the zinc alloy level at least one inch above the crucible, preventing the alloy level from dropping too low, which could allow slag to enter the shot sleeve and jam the plunger.
- 6) Zinc alloy material should be kept clean and free from moisture, oil, grease, and other impurities;





04-3 Hot Chamber Machine Daily Use and Maintenance



Daily Maintenance Guidelines for Hot Chamber Machines – Part Two

- 7) Use a nozzle body with a taper matching the swan neck tapered hole;
- 8) If leakage is detected from the goose neck cone hole, immediately disassemble the nozzle body. First, thoroughly clean the alloy material from the tapered surface of the nozzle body, then clean the alloy material from the cone hole inside the goose neck sprue cup. Finally, reinstall the nozzle body according to the proper installation procedure.
- 9) During work breaks (such as mold changeover or mold repair), the temperature of the gooseneck and nozzle body should be reduced to below 380°C to minimize corrosion. (Note: Before resuming die-casting, the gooseneck and nozzle body temperatures must first be raised back to the required operating temperature.)
- 10) If production is to be halted, the shot sleeve plunger (hammer head) should be removed before shutdown, and two-thirds of the molten alloy should be poured out, taking care that the furnace temperature probe does not leave the surface of the molten metal.
- 11) Regularly replace the steel mold (recommended once a month) and the plunger (recommended every three months);
- 12) When loading or unloading the injection plunger and steel bar, no foreign objects should fall into the mold cavity.





04-3 Hot Chamber Machine Product Daily Use and Maintenance



Daily Maintenance Guidelines for Hot Chamber Machines – Part Three

- 13) The crucible should be cleaned before use to remove surface dirt, oil, iron filings, and other slag.
- 14) Preheating treatment is required before use (first heat to approximately 200°C and hold for one hour), followed by staged heating until reaching normal operating temperature, to eliminate casting stresses and prevent crucible cracking.
- 15) When starting to melt the material, first add scrap or molten alloy, and preferably submerge the alloy ingot added later into the solution.
- 16) If the downtime exceeds a long period (typically more than 8 hours), remove the hammers before shutdown and ~~pour~~ out two-thirds of the alloy melt. Ensure the bottom of the temperature probe remains submerged in the molten material to shorten the next melting time, prevent uneven heating of the crucible, reduce thermal stress caused by expansion and contraction of the alloy melt, and avoid cracking at the bottom of the crucible.





04-3 Hot Chamber Machine Product Daily Use and Maintenance



Daily Maintenance Guidelines for Hot Chamber Machines – Part Four

- 17) During normal operation, the injection pressure should not exceed 95% of the rated pressure; otherwise, the service life of the nozzle body will sharply decrease.
- 18) The nozzle outlet diameter must be properly sized to prevent excessive internal pressure caused by an overly small opening, which would reduce the nozzle's service life.
- 19) The temperature probe on the heating coil should be checked regularly to ensure accurate temperature measurement;
- 20) The rated operating voltage of the heating element is 220V AC, and the temperature should be controlled between 380°C and 450°C. Excessive temperature may cause short-term damage to the heating element.
- 21) Avoid splashing zinc alloy material onto the surface of heating elements; if it does occur, clean it off promptly.
- 22) New heating elements must be preheated before use: Set the thermostat to 100°C and maintain this temperature for thirty minutes, allowing any absorbed moisture inside to evaporate. Then gradually increase the temperature in 2–3 stages to reach the desired operating temperature. This process ensures complete removal of moisture from the casting and prevents short circuits or damage to the heating wire caused by damp heating elements.





04-4 Hot Chamber Machine Common Fault Analysis



1, card hammer

- 1) Check whether the plunger rod is aligned with the center of the shot sleeve (install the injection plunger and verify if it rotates smoothly by hand);
- 2) Check whether the furnace temperature is normal, ensuring it falls within the range of 410 to 430°C;
- 3) Check whether the surface of the furnace thermocouple protection tube is corroded and whether the wiring is correct;
- 4) Failure to promptly remove slag and failure to add alloy material in time (the alloy surface should be about one inch below the crucible rim) causes slag to enter the sleeve, resulting in hammer jamming.
- 5) Using inferior-quality or lower-grade materials for components such as ladles, plunger rods, and steel dies not manufactured by our company may also result in hammer jamming.





04-4 Hot Chamber Machine Common Fault Analysis



2, Shot sleeve (ram) cracking

- 1) Check the plunger rod and shot sleeve

After analysis and summary by our technical personnel, it has been determined that the cracking of the plunger is directly related to spot welding. Therefore, we recommend that spot welding should not be used at the connection between the ram rod and the plunger.

- 2) If there is no spot welding, please contact our customer service for assistance.



3, flipping the material

- 1) Inspect the steel pin; if it is worn or broken, replace it.
- 2) Check whether the outer circumference of the plunger is worn, scratched, or if the steel groove is damaged; if so, replace the plunger.
- 3) If all the above conditions are normal, please contact our customer service personnel.





04-4 Hot Chamber Machine Common Fault Analysis



4, material feeding pot with goose neck spout leaking

- 1) The conical spout of the material pot is damaged, causing leakage; the spout needs to be repaired.
- 2) Leakage caused by incorrect nozzle taper; replace the nozzle body with one that meets the requirements.
- 3) Incorrect installation of the nozzle body; clean the conical hole of the hopper and the conical surface of the nozzle body.
Clean and reinstall properly.



5, insufficient material filling or failure to dispense material

- 1) Check if the hammer handle is too long, and check if the goose neck temperature is too low;
- 2) The stainless steel tube in the material pot assembly may become clogged by material residue or foreign objects.
Please contact our customer service to return the water pot assembly for cleaning.





04-4 Hot Chamber Machine Common Fault Analysis



6, casting perforation or cracking causing material leakage

Contact our customer service department; the material pot assembly needs to be returned to the company for inspection and analysis, and further action will be taken based on the findings.

2) If a crucible is found to be leaking, replace it immediately to prevent injury, fire, or damage to the heating element.

Leakage at the junction between the nozzle body and nozzle tip

- 1) The nozzle tip does not match the taper; replace it with a nozzle tip that meets the taper requirements, as the installation clearance is too large.
- 2) Corrosion or perforation of the nozzle body; replace with a new nozzle body.
- 3) The nozzle is improperly installed; reinstall it according to the correct method (refer to the nozzle user manual).





04-4 Hot Chamber Machine Common Fault Analysis



8 Leakage at the mold feed gate

- 1) Check whether the nozzle is installed correctly;
- 2) The mold sprue diameter does not match the nozzle outlet; replace the nozzle with one that meets the requirements.
- 3) The center of the nozzle tip and the center of the mold gate should be concentric, with the alignment deviation controlled within 0.2 mm;
- 4) Damage to the nozzle mating surface; replace the nozzle.
- 5) The mold feed gate mating surface is damaged and deformed.



9, the heating element is not heating up

- 1) Check whether the casting surface of the heating plate is corroded or cracked; at the same time, inspect the surface where the heating plate contacts the goose neck.

Yes

Not flat;

- 2) Check whether the heating plate output wire is broken, and inspect if the wire protection tube has been corroded by splattered zinc alloy material.

Erosion;

- 3) Use a multimeter to test the power wires at both ends of the heating pad to check for an open circuit in the heating element.





04-4 Hot Chamber Machine Common Fault Analysis



10. Abnormal wear and breakage of steel pins

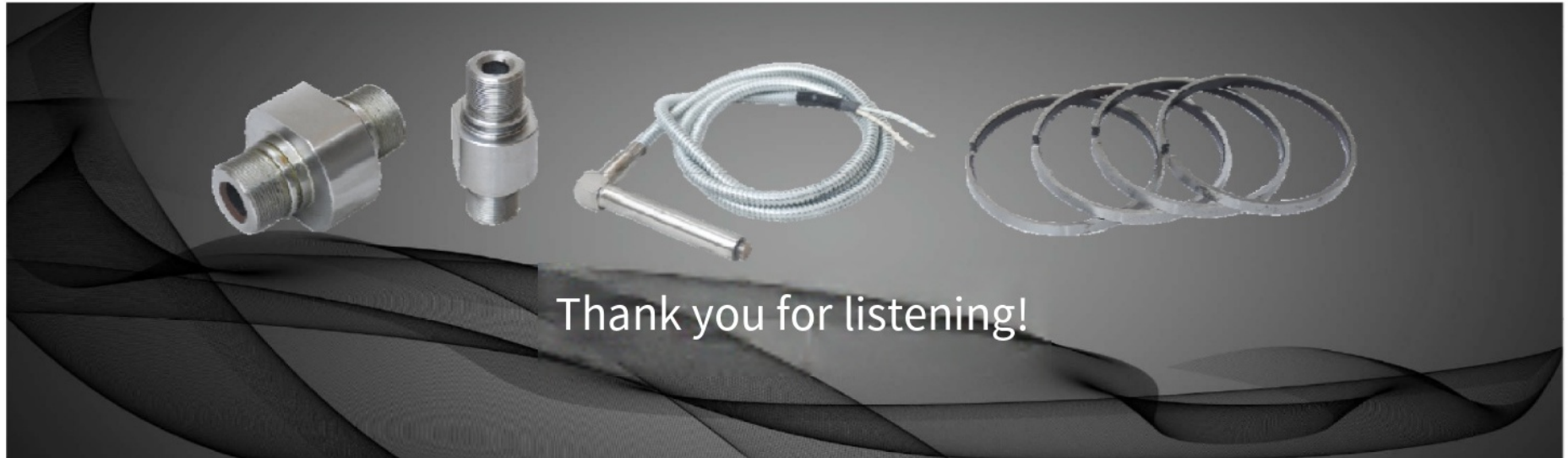
- 1) Molten slag entered the sprue bushing, scratching the steel sleeve and the plunger.
- 2) Deformation caused by spot welding between the hammer handle and the plunger leads to uneven wear on one side of the steel ring.
- 3) Contact our customer service personnel promptly for resolution.

11. Longitudinal crack in the nozzle tip

Please contact our customer service team promptly to resolve the issue.



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Training Syllabus for the Promotion of Hot Workpiece Technology

Technical Promotion Department, Hot Work Components Division