THINK TECH FORWARD

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YIZUMI

RHEO

380T-2500T

ULTRA-LOW SPEED & HIGH PRESSURE AL RHEOCASTING MACHINE

High Quality Rheo Casting by YIZUMI



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【1】YIZUMI reserves the right to modify the product description in the catalogue. Specification might be changed without prior notice.

【2】The picture in the catalogue is for reference only. The real object should be considered as final.

【3】The data in the catalogue is obtained from internal testing in YIZUMI laboratory.

Please refer to the actual machine for the final data. YIZUMI reserves the right of final interpretation upon disputes and ambiguities.

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AI Rheocasting
Development Process

With the growing technology progress and market demand, Yizumi has developed AI Rheocasting machine to meet the unique requirements in performance, cost, and cycle time, which outperforms most other foreign-made semi-solid die-casting equipment.

1971
Massachusetts Institute of Technology (MIT)discovered semi-solid metal rheological properties

2000
Thixomolding industrialization

2010
AI Rheocasting is being adopted in larger scale in the casting market

2020
YIZUMI's develops its first AI Rheocasting machine

2021
Launch of YIZUMI's first AI Rheocasting solution

2023
YIZUMI launched first AI Rheocasting mass production

2025
YIZUMI successfully delivered 1250T AI Rheocasting machine

Future
Enter into a new era of ultra large AI Rheocasting machine

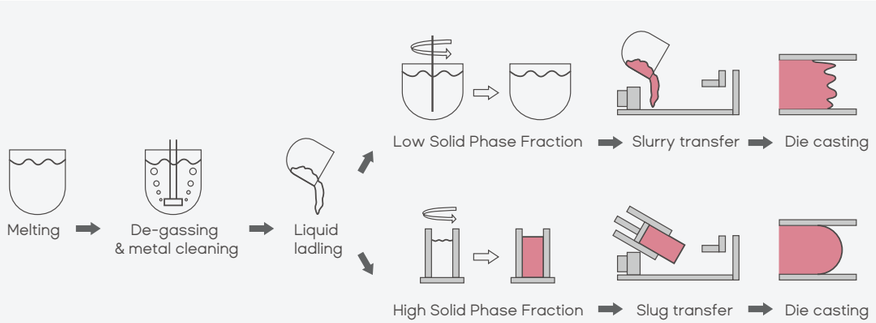
AL RHEOCASTING

Innovative Process providing Exceptional Quality

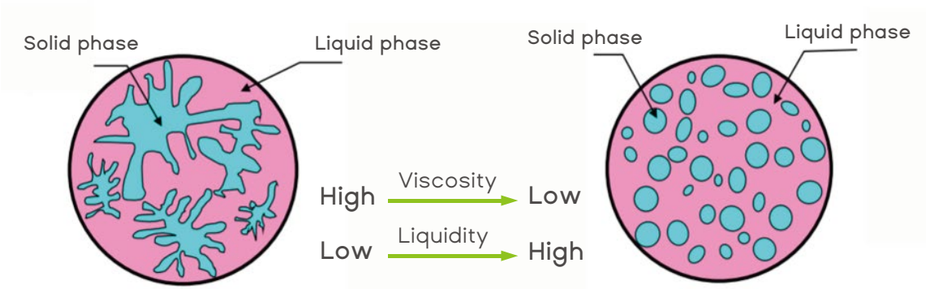
RheoCasting, or semi-solid forming, is a process where aluminum alloys are injected into steel dies while partially solid (20%–70% solid). Injecting at low speeds allows for smooth, laminar flow and reduces air entrapment common in traditional high-pressure die casting. The equipment applies high pressure during intensification to prevent shrinkage during casting.

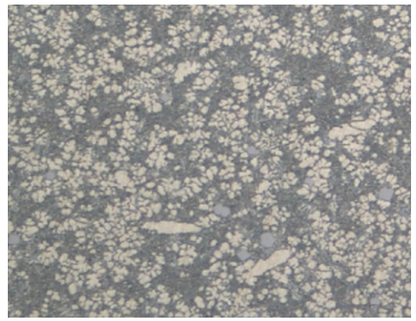
Schematic Diagram of Al Rheoforming

Rheocasting involves melting an aluminum alloy and cooling it to approximately 580–610 °C, achieving a solid fraction of 20–70%. During cooling, the melt is mechanically or electromagnetically agitated to disrupt dendritic growth and form a fine, globular microstructure. The resulting semi-solid slurry is then rapidly injected into a steel die under high pressure. Owing to the semi-solid processing state and reduced processing temperatures, rheocasting significantly lowers porosity and thermal load on the die, thereby improving casting quality and extending tool life.

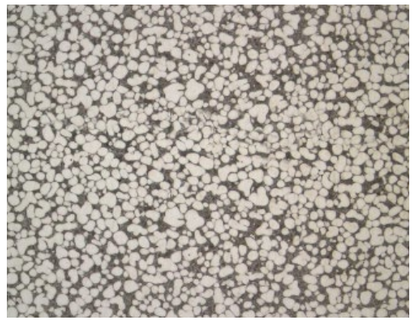


Two RheoCasting processes are distinguished. Employing semi-solid aluminum alloys with a low solid fraction can improve the quality of conventional liquid die cast components. Conversely, RheoCasting with a high solid phase fraction yields die cast parts featuring superior microstructures and optimal mechanical properties, which may be further enhanced through heat treatment.





Dentritic microstructure of High-Pressure Die Casting



Globular microstructure of RheoCasting

Three major pain points of the traditional die casting process

Traditional die casting presents notable limitations when applied to components requiring high mechanical performance, intricate thin-walled designs, or specialised heat treatment processes:

Gas & Shrinkage Porosity

Traditional high pressure die casting often leads to air entrapment or poor shrinkage compensation due to rapid cavity filling, tool design, and machine limits. These issues can reduce final casting quality.

Heat treatment Limitations

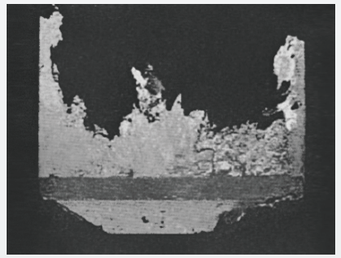
Standard castings are not suitable for T6 heat treatment, as internal porosity tends to expand at elevated temperatures, resulting in part deformation or blistering.

Mechanical Performance

Conventional die-cast components may lack sufficient yield or tensile strength for certain functions, while semi-solid or gravity/permanent mold castings usually offer better mechanical properties.

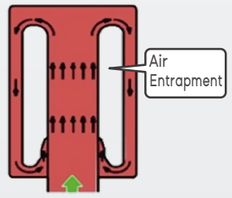
Pain points of traditional die casting

Die casting process is prone to entrap air





Air entrapment during die casting

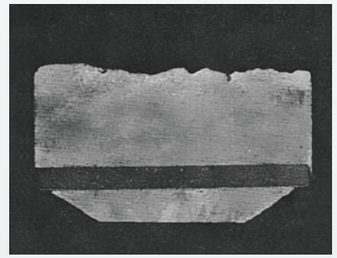


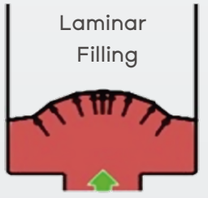
DIE CASTING

VS

Breakthrough in Semi-Solid Forming

Lower porosities with laminar cavity filling at lower velocity





SEMI-SOLID

Process Benefits of Al Rheocasting

1. Higher Rheocasting Quality

Excellent density and reduced porosity	Low viscosity of semi-solid metal minimises flow turbulence during cavity filling. The resulting laminar flow effectively decreases porosity, thereby improving component density and ensuring superior quality.
Heat treatable and weldable	Al Rheocasting components facilitate T6 heat treatment strengthening and offers excellent weldability, resulting in markedly improved structural strength and reliability.
Higher dimensional precision	Semi-solid materials are processed at lower temperatures effectively reducing deformation, making them well-suited for manufacturing high-precision components.

2. Energy conservation and cost reduction

Reduced machine sizes (some cases)	High product quality rate	Extend mold service life
Thin-walled castings require very high filling speeds. In rheocasting, thixotropic flow enables lower injection speeds and reduced clamping force.	With high-solid fraction, the semi-solid metal flow features a dense internal structure in the filling phase, leading to higher-quality casting components.	Processing of semi-solid metal with lower metal temperatures and slow, laminar filling reduces shrinkage porosity and extends tool life.

YIZUMI Al Rheocasting

Suitable for high precision, high strength, thin walled & ultra thick-walled parts

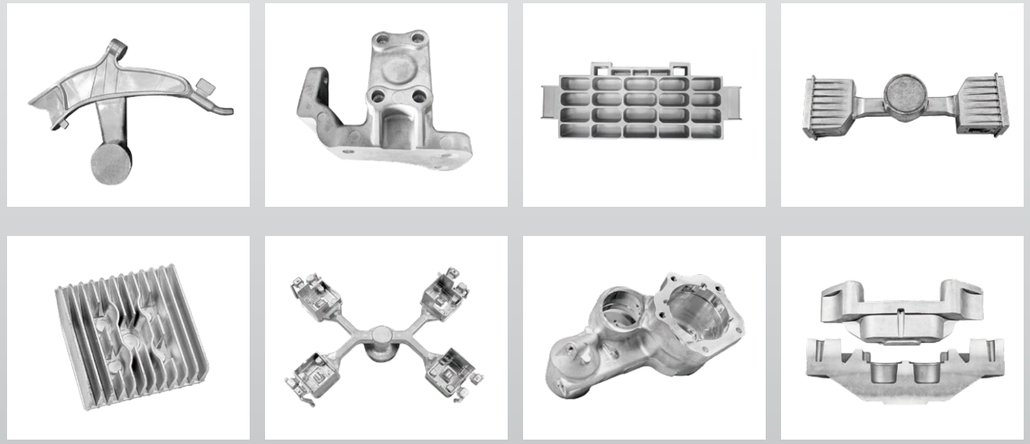
Wider range of Al alloys then HPDC and improved heat conductivity for heat-sink casting components

Clamping force range: **3,800kN-25,000kN**

(Customizable above 25,000 kN)

3. Wide range of Applications

New energy vehicles, 3C electronics, cycling, transport, etc.



YIZUMI AI Rheocasting Technology Leads Aluminium Alloy Revolution

The YIZUMI AI Rheocasting machine, equipped with advanced LEAP technology and the ORCA control system, achieves accurate low-speed, high-pressure forming. These innovative capabilities enhance cavity filling, resulting in superior surface quality and casting density. This enables the efficient manufacturing of intricate aluminium alloy components and establishes a new benchmark in die casting.

Intelligent

ORCA control system

YIZUMI's ORCA control system allows highly precise multi-stage velocity regulation with real-time-closed loop injection control, ensuring best in class casting process repeatability and stable cavity filling. Integrated data management enhances production efficiency, while its user-friendly HMI improves production efficiency.

Stability

High performance injection unit

Fast-response servo valves and flexibly programmable injection profiles efficiently meet production requirements for both complex thick- and thin-walled structural components. Consistent cavity filling of semi-solid slurry significantly improves casting integrity, thereby ensuring enhanced production reliability.



Energy Saving

High-efficiency servo drive for optimized energy consumption

An advanced servo drive system enhances energy efficiency, while an innovative structural machine design reduces maintenance needs, resulting in more cost-effective operations.

Precision

Accurate injection for dimensional casting accuracy

Advanced injection control based on LEAP real-time-closed loop technology ensures highest process precision and repeatability leading to stable casting production of complex components.

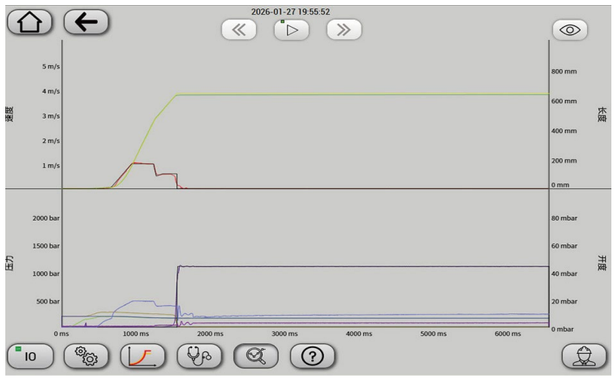
RHEO

* Data were obtained under specific test conditions; actual performance may vary. Provided for reference only, not as a commitment.

RHEO-Smart Injection System

YIZUMI Al Rheocasting with its smart injection system offers multi-phase real-time closed loop control technology, ensuring precise low-speed and high-pressure cavity filling. This system ensures consistent metal flow, substantially improving both the surface finish and internal density of castings, allowing to produce high-quality complex structural components in a single operation. Intelligent adjustment features provide reliable and efficient manufacturing performance, meeting the requirements of advanced industrial applications.

- High dynamic injection force;
- Precise 10 stroke/velocity points programmable to perfectly optimize injection;
- Precise 10 time/pressure points programmable to perfectly optimize the intensification phase;
- Proven RHEO injection with ORCA control;
- Genuine closed-loop control, system pressure of 21MPa;
- Injection self process adjustment via machine self-learning and real-time-closed loop control.



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RHEO Peripheral Devices

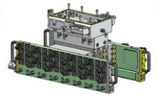

Rotary Crucible Cleaning


Melt Transfer Robot


Adaptable Hydraulic QDC


Quick Die Change(QDC)


Tube Spraying


General Spraying


Water Cooling


Jet Cooling


Exhaust Hood Solution


Pipework


Holding Furnace


Metal/Slurry Preparation Device


Robot Ladle


Cell Distribution Cabinet


Electrical Control System


Rheocasting Machine


Spray Media Mixing Machine


Air Tank Spray


Safety Fence


Pick & Place Extractor


Extractor Robot


Conveyor & Cooler


Product Inspection

TECHNICAL DATA

ITEM	UNIT	RHEO380	RHEO530	RHEO840	RHEO1250	RHEO1650	RHEO2000	RHEO2500
Clamping Unit								
Die Locking Force	kN	3800	5300	8400	12500	16500	20000	25000
Die Stroke	mm	550	580	760	1000	1200	1400	1500
Die Height (Min.-Max.)	mm	300-750	350-850	400-950	450-1200	500-1400	600-1600	700-1800
Platen Dim. (H x V)	mm	1000×1000	1150x1150	1420x1420	1730x1730	2000x2000	2150x2150	2350x2350
Tie-Bar Space (H x V)	mm	650×650	750x750	930x930	1100x1100	1250x1250	1350x1350	1500x1500
Ejector Force	kN	180	240	360	550	600	650	750
Ejector Stroke	mm	130	140	180	200	250	300	300
Injection Unit								
Injection Stroke	mm	600	670	760	1000	1050	1050	1400
Low Speed (Min.)	m/s	0.02	0.02	0.02	0.02	0.02	0.02	0.05
Max. Speed	m/s	≤4m/s	≤4m/s	≤4m/s	≤4m/s	≤4m/s	≤4m/s	≤5m/s
Plunger Diameter	mm	60-80	70-90	80-110	100-140	110-150	120-160	130-170
Injection Weight (Al)	kg	3.1-5.6	4.3-7.0	7.0-13.3	14.5-28.4	18.4-34.3	21.9-39.0	34.4-58.9
Casting Pressure (intens.)	MPa	202-113	182-110	179-94.7	165.5-84.4	158-85	133-75	143-83
Casting Area	cm^2	189-335	291-482	469-887	755-1481	1044-1941	1504-2667	1748-3012
Injection Position	mm	0/-175	0/-220	0/-250	0/-300	0/-300	0/-300	0/-300
Plunger Following Stroke	mm	270	270	300	400	450	450	500
Shot Sleeve Flange Diameter	mm	130	150	200	240	260	260	280
Shot Sleeve Flange Protrusion	mm	15	15	20	25	25	30	30
Others								
Working Pressure	Mpa	21	21	21	21	21	21	21
Motor Capacity (SM)	kW	66.3	66.3	66.3	176.8	176.8	176.8	265.2
Hydraulic Oil Tank Capacity	L	1000	1000	1200	2200	2800	2800	4000
Machine Dimension(L×W×H)	mm	8190x2750x3480	8300x2970x3590	9100x3140x3930	11600x4500x4590	12850x5180x4650	13460x5630x4820	15500x6130x5000

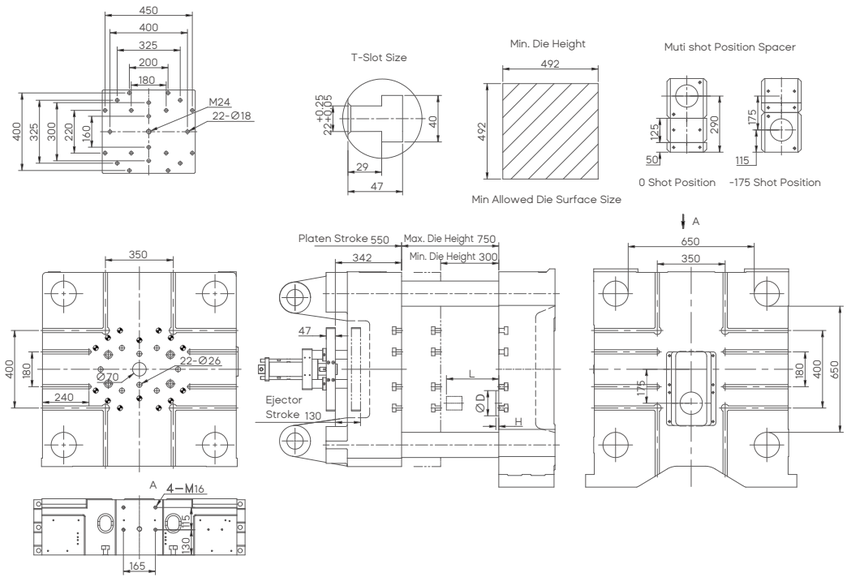
Note: Please contact the manufacturer for other tonnage options.

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Platen Dimensions

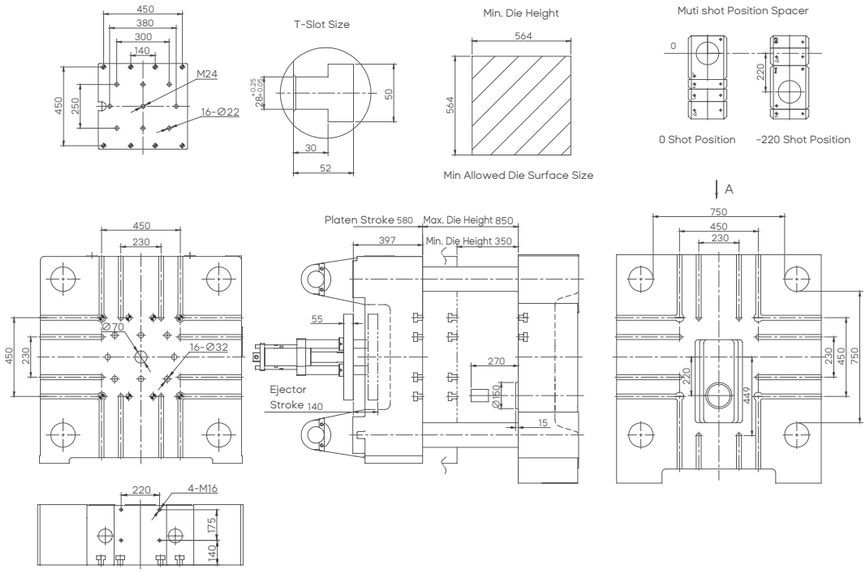
RHEO380

The marked holes here indicate that both push rods and pull rods may be inserted from either side of the ejector plate. While the other holes can only insert from the rear platen to the ejector plate. When installing push rods and pull rods, please ensure to install symmetrically.



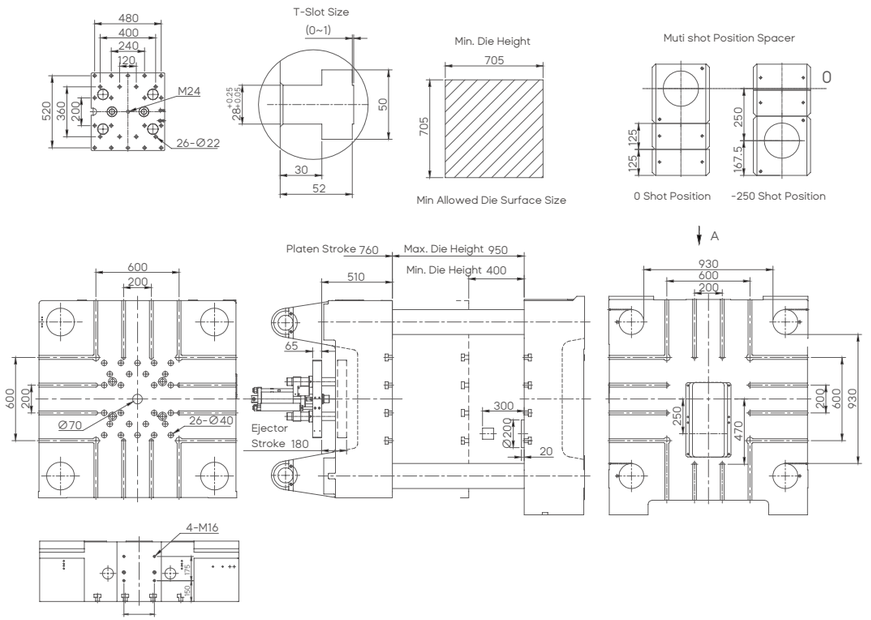
RHEO530

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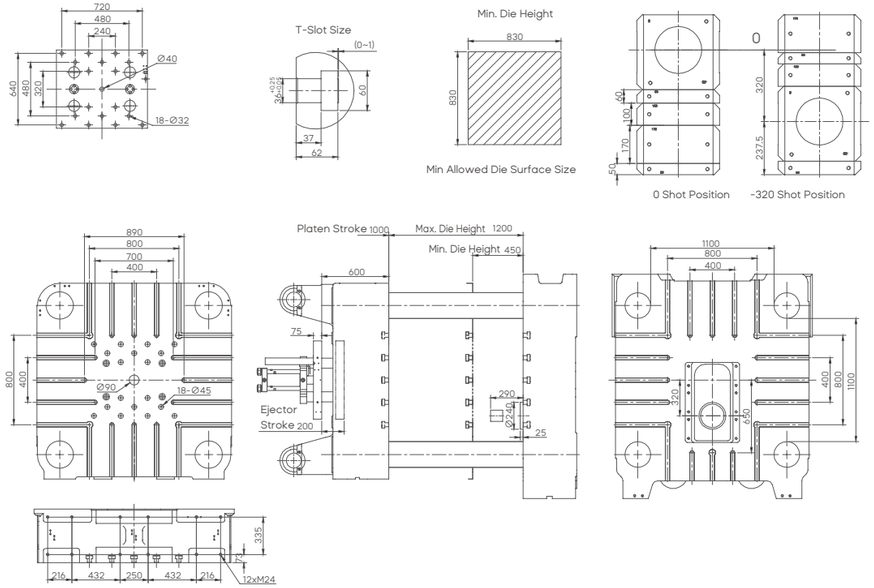
RHEO840

The marked holes here indicate that both push rods and pull rods may be inserted from either side of the ejector plate. While the other holes can only insert from the rear platen to the ejector plate. When installing push rods and pull rods, please ensure to install symmetrically.



RHEO1250

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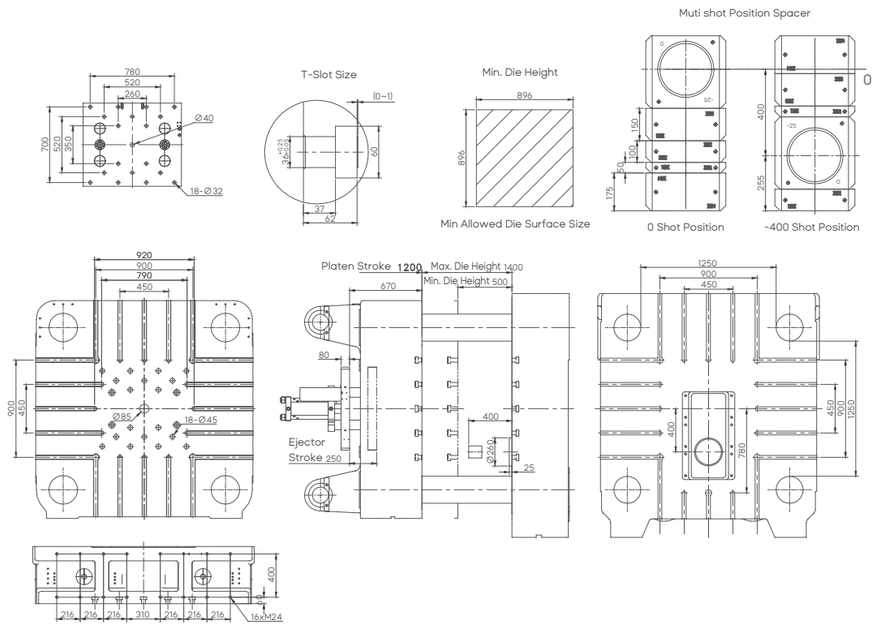


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Platen Dimensions

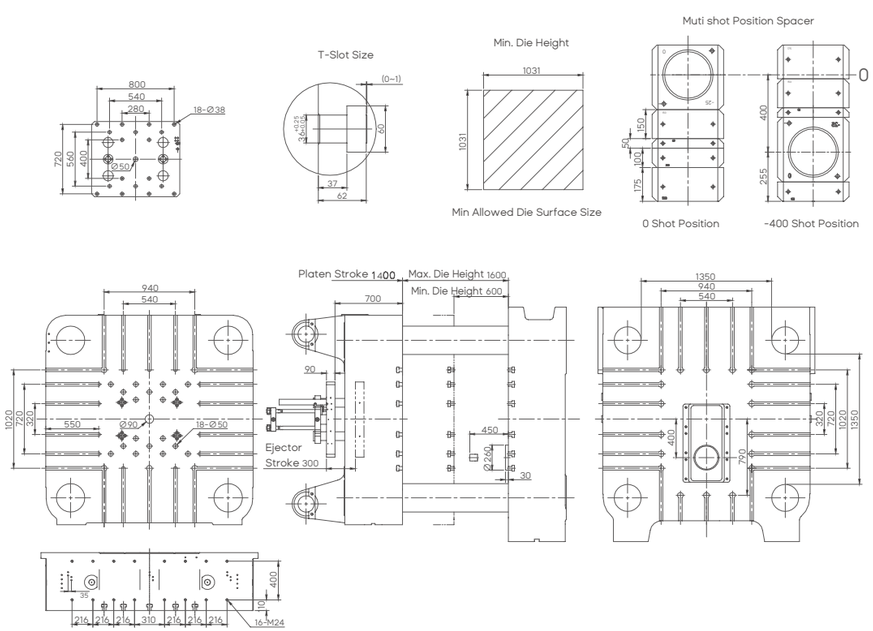
RHEO1650

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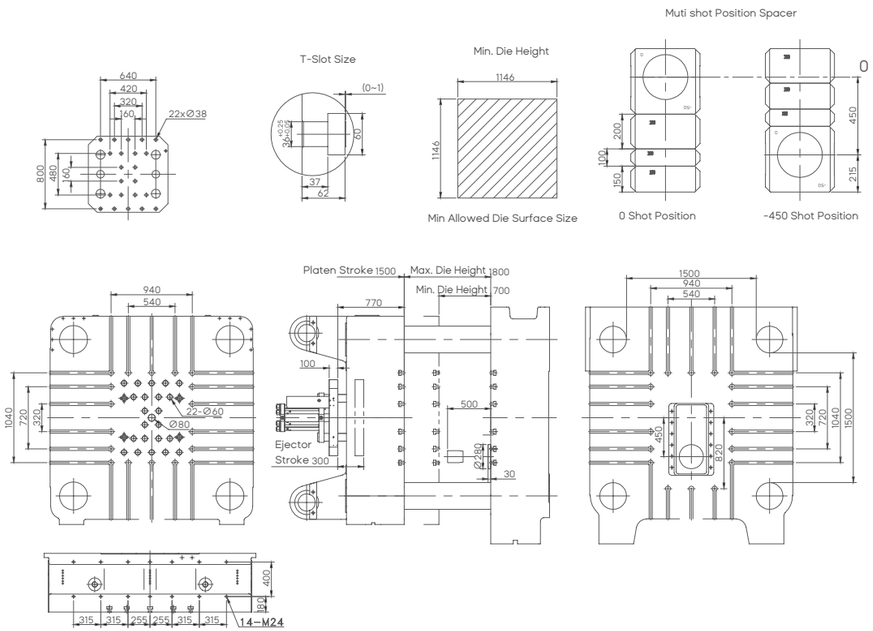
RHEO2000

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RHEO1250

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