

**金口公司** 已累積了數十年的球狀石墨鑄鐵蒸汽閥的專業製造經驗，提供10K、16K到20K整系列安全可靠、品質穩定之產品。  
**KING GATE** has been firmly established as a supplier DUCTILE IRON STEAM VALVES for several decades.

**能源** – 是逐年增值的寶貴資源，製造業利用熱能，例如加熱產品、蒸發過程、滅菌和食品加工，或者用於能源設施，包括發電廠、燃氣和石油設施。蒸汽是許多應用中使用的介質。

**Energy** – an increasingly valuable resource from year to year – is used by the manufacturing industry in the form of heat, for example to heat products or for evaporation processes, sterilisation, and food processing or energy facilities including power generation plants, gas and oil plants. Steam is the media employed in many of these applications. KING GATE 's proven expertise and reliability whenever steam, hot water or condensate applications from 10K, 16K to 20K need to be controlled SAFELY and RELIABLY.

## 應用領域 Field

**行業：** 食品和飲料、電力工廠和可再生能源、鋼鐵廠、區域供熱、建材、木材、紙漿和造紙、輪胎、鍋爐、制冷

**化學工業：** 有機化學品、醇類、聚合物

**工廠製程：** 發電廠、石油和天然氣、冶金、造紙、工程木材製造

**造船業：** 冷卻水系統、壓艙水系統、排氣系統和輔助鍋爐、暖通空調系統

**暖通空調：** 供暖、空調和冷水、區域供熱、熱水和蒸汽

**Industry:** Food and beverages, Power plants & renewable energy, Steelworks, District heat, Building materials, Wood, pulp and paper, Tyres, Boilers, Refrigeration

**Chemical Industry:** Organic chemicals, Alcohols, Polymers

**Plant engineering:** Power plants, Oil & gas, Metallurgy, Paper, Engineered wood manufacturing

**Shipbuilding:** Cooling water systems, Ballast water systems, Exhaust gas and auxiliary boilers, HVAC systems

**HVAC:** Heating, Air conditioning and cold water, District heat, Hot water & steam

## 適用工廠 Applicable plant

- 蒸汽、熱水或熱油供應的管道
- 空調、冷水和暖氣系統
- 一般高壓氣體應用
- Piping for steam or Hot water or Thermal oil supply
- Air conditioning and cold water & heating systems
- High pressure gaseous service in general
- piping for poisonous gas service

## 應用建議 Service Recommendation

球狀石墨鑄鐵蒸汽閥非常適用於高溫或低溫條件下需要較高機械抗震能力的場合，相較於普通灰口鑄鐵閥門，球狀石墨鑄鐵蒸汽閥具有更好的抗拉強度和延展性，有時甚至可以替代鑄鋼閥門。

Ductile iron valves are highly recommended for higher mechanical shock resistance under high or low temperature services, and better tensile strength and elongation characteristics than those of ordinary gray iron valves, sometimes replace of cast steel valves.

## 適用於閥門的球狀石墨鑄鐵特性 Ductile Iron features suited to valves

灰口鑄鐵、球狀石墨鑄鐵和可鍛鑄鐵是常見用於閥門製造的三種鑄鐵材料。與灰口鑄鐵不同，球狀石墨鑄鐵和可鍛鑄鐵的金屬結構含有球狀石墨（參考顯微鏡觀察）。這種結構使得球狀石墨鑄鐵和可鍛鑄鐵具有優於灰口鑄鐵的機械性能，幾乎與昂貴的鑄鋼閥門材料相當。此外，它們優異的鑄造性和加工性能有助於增加其作為閥門材料的適用性。

球狀石墨鑄鐵由於其更好的機械特性，在閥體的構建方面優於可鍛鑄鐵。閥體是一種壓力容器，例如；它具有 20% 更高的抗拉強度和 70 至 80% 更好的延展性。這種差異來自於球狀石墨分子不同的形成過程。

球狀石墨鑄鐵還具有比鑄鋼更好的耐磨性、耐腐蝕性和耐氧化性，因此在城市建設領域以及水、鹽水和蒸汽環境中廣泛應用。因此，它非常適合生產閥門零件，此外，球狀石墨鑄鐵的成本遠低於不銹鋼。

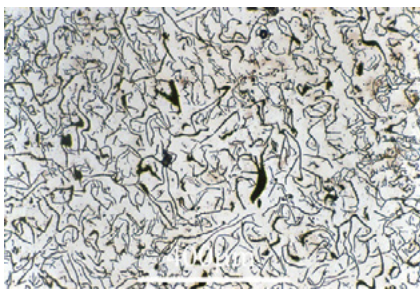
金口的球狀石墨鑄鐵閥門採用 JIS FCD450-10（按需提供 FCD-S）或 ASTM A536-65-45-12（按需提供 ASTM A395）球狀石墨鑄鐵材料製成。球狀石墨鑄鐵閥門在市場上的引入歷史相對較短，然而，由於其成本優勢以及廣泛的應用範圍與鑄鋼閥門相當，需求正在穩定增加。

Gray iron, ductile iron and malleable iron are the three kinds of iron used for valve construction. Unlike gray iron, which has thin, flake-like molecular formations, the metallic structures of both ductile and malleable iron contain nodular graphite. (Refer to the microscopic views) This structure provides ductile and malleable iron with mechanical properties which exceed those of gray iron. It almost equals the properties of cast steel, which is an expensive material for industrial valves. Furthermore, their superior castability and machinability help to increase their suitability as a valve material.

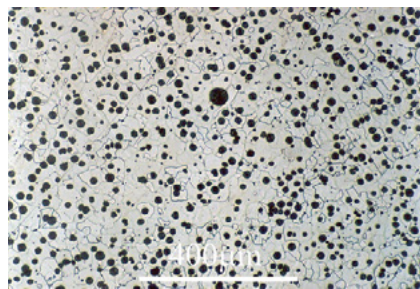
Ductile iron outperforms malleable iron due to its better mechanical characteristics to build valve body, which is a kind of pressure containing device. For example, it has a 20% higher tensile strength and 70 to 80% better elongation. This difference comes from different formation process of nodulated graphite molecules.

Ductile iron also has better abrasive resistance, corrosion resistance and inoxidizability properties than cast steel, so ductile iron castings have wide application in urban construction fields, and in the environments of water, saline water and steam. So, it is suitable for producing valve parts, moreover, ductile iron costs are much lower than stainless steel.

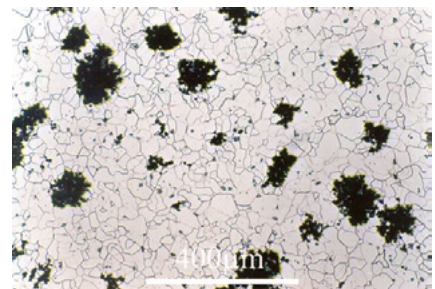
KING GATE ductile iron valves are made of JIS FCD450-10 (FCD-S on request) or ASTM A536-65-45-12 (ASTM A395 on request) ductile iron. The history of the introduction of ductile iron valves on the market is rather short, however, the demand is steadily increasing as a result of their economic advantage as well as the fact that their wide range of service applications is comparable with cast steel valves.



灰口鑄鐵  
Gray iron



球狀石墨鑄鐵  
Ductile iron



可鍛鑄鐵  
Malleable iron

## JIS G 5502: 2001 Grade FCD450-10 Spheroidal graphite iron castings

### 1. Chemical composition :

Carbon (C) : 2.50% minimum  
Phosphor (Mg) : 0.09% maximum  
Silicon (S) : 0.02% maximum

### 2. Mechanical properties :

Tensile strength : 450N/mm<sup>2</sup> minimum  
Yield strength : 280N/mm<sup>2</sup> minimum  
Elongation : 10% minimum  
Brinell hardness : 140 to 210

- ◆ 金口使用 DIAS 和 sinto 立式、臥式全自動造模機生產高品質的球狀石墨鑄鐵閥門鑄件。
- ◆ KING GATE utilizes DIAS and Sinto vertical and horizontal fully automatic molding machines to manufacture high-quality ductile iron valve components.



- ◆ 配備液壓夾具的水平加工中心，確保穩定的加工尺寸，保證加工精度。
- ◆ Horizontal Machining Center with hydraulic jig fixture, ensuring machining precision for stable machining dimension.



### 金口球狀石墨鑄鐵閥門設計規格 KING GATE ductile iron valves Design Specification:

- Design and manufacture acc. to JV(Japan Valve Manufacturer's Association Standard)
  - JV4-2 : Cast iron valves-Blackheart malleable iron and spheroidal graphite (ductile) iron small sized valves. 1991
  - JV4-3 : Cast iron valves-Blackheart malleable iron and spheroidal graphite (ductile) iron valves. 1991
  - JV4-4 : Cast iron valves-Special grade blackheart malleable iron and spheroidal graphite (ductile) iron small sized valves. 1991
  - JV4-5 : Cast iron valves-Special grade blackheart malleable iron and spheroidal graphite (ductile) iron valves. 1991
- Shell wall thickness acc. JIS 2031: Gray cast iron valves 2013
- Face to face dimensions acc. to JIS B 2011: Bronze, gate, globe, angle, and check valves 2010  
JIS B 2002: Face-to-face and end-to-end dimensions of valves 1987
- End to end dimensions acc. to JIS B 2051: Malleable iron and ductile iron valves 2013
- Flanges dimensions acc. to JIS B 2239: Cast iron pipe flange 2013
- Thread dimensions acc. to JIS B 0203: Taper pipe thread. 1999
- Test pressure Dimensional inspection acc. to JIS B2003: General rules for inspection of valves 2013