

---

**SERIES M1**

**Severe Service Metal Seated Ball Valves  
for Delayed Coking**



---

**Bray**<sup>®</sup>

[WWW.BRAY.COM](http://WWW.BRAY.COM)

THE HIGH PERFORMANCE COMPANY

**Size Range:**  
1/2" - 36" (DN 15- DN 900)

**Temperature:**  
Up to 1500°F (815°C)

**Pressure Rating:**  
ASME 150 - ASME 4500



Delayed coking is a unit process that maximizes production by upgrading low value residual hydrocarbons (bottoms) into more valuable products. The bottoms from the vacuum distillation column are fed into a fractionator and then pumped to the furnace where they are heated to temperatures exceeding 900°F. These high temperatures cause the heavy, long chain hydrocarbon molecules to crack or break down into lighter components. Steam is injected to delay the formation of coke until the effluent reaches the coke drum. Solid coke is deposited inside the high temperature, low pressure coke drum while the lighter vapors are routed to the fractionator for separation and recovery. As one drum fills, the other is stripped with steam, cooled and drained. Next, high pressure water jets are used to cut the solid coke for removal and the drum is prepared for the next cycle. Among the harshest processes in a refinery, valves for delayed coking must be able to handle high temperatures, solids and high cycles.

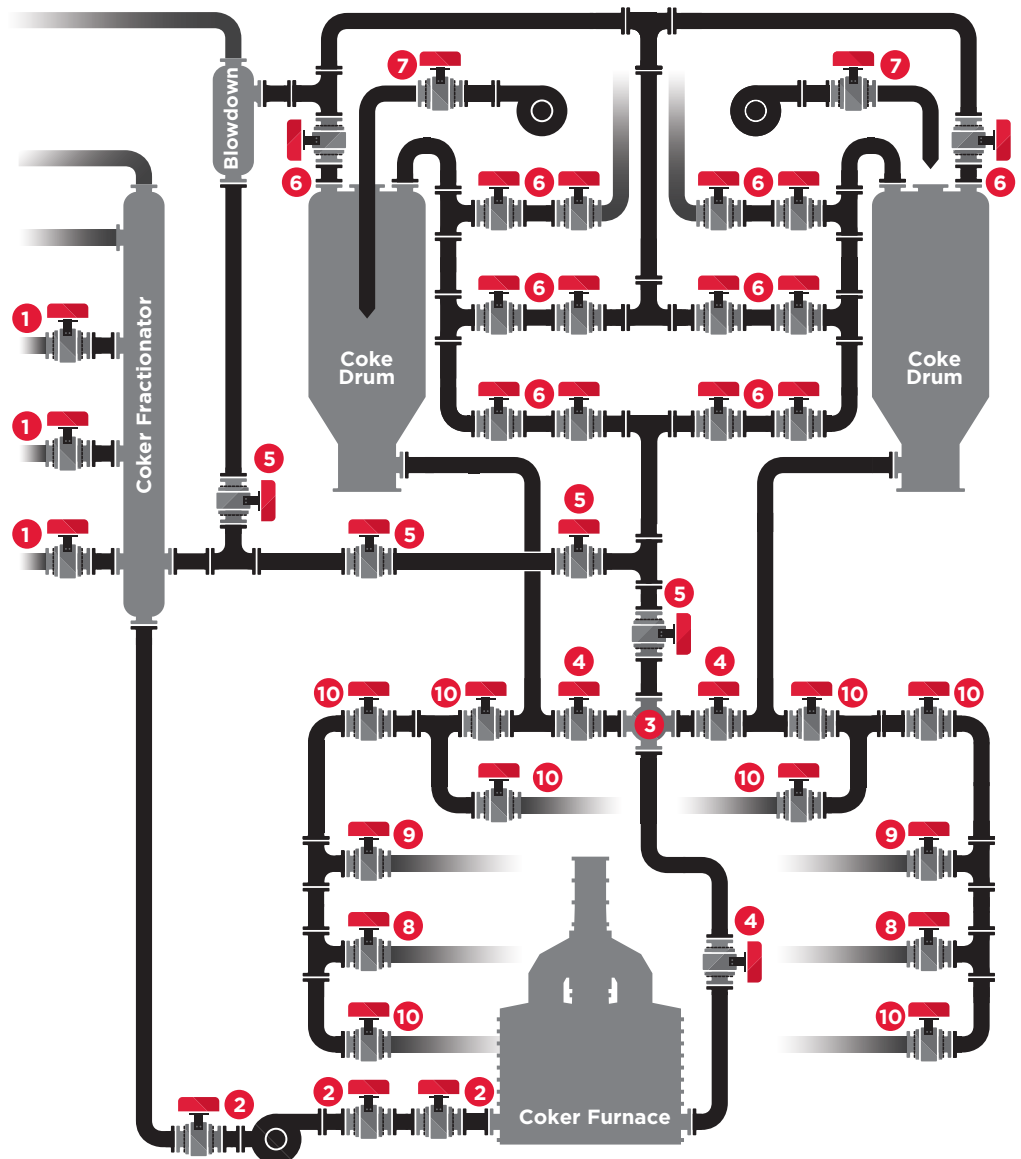


### Process Challenges:

- High Temperature (500-950°F)
- High Pressure Water (2000-4000 psig)
- Erosive/Abrasive Media
- Coke Formation
- High Cycles

### Typical Applications:

- |    |   |
|----|---|
| 1  | Coker Fractionator Valve<br>3"-18"<br>(680-750°F, 30-500 psig)                |
| 2  | Furnace/Feed Pump<br>Isolation Valves<br>3"-18"<br>(680-750°F, 30-500 psig)   |
| 3  | Multiport Switch Valve<br>3"-18"<br>(920-950°F, 100-200 psig)                 |
| 4  | Coke Feed Valve<br>3"-18"<br>(920-950°F, 100-200 psig)                        |
| 5  | Bypass Isolation Valve<br>3"-18"<br>(920-950°F, 100-200 psig)                 |
| 6  | Overhead Vapor<br>Isolation Valve<br>10"-36"<br>(800-850°F, 50-90 psig)       |
| 7  | High Pressure Cutting<br>Water Valve<br>2"-12"<br>(100-150°F, 2000-4000 psig) |
| 8  | Steam Stripping Valve<br>1"-18"<br>(100-900°F, 30-100 psig)                   |
| 9  | Quench Water Valve<br>1"-18"<br>(100-900°F, 30-100 psig)                      |
| 10 | Drain Isolation Valve<br>1"-18"<br>(100-900°F, 30-100 psig)                   |



Engineered for zero-leakage isolation in harsh, high cycle delayed coking applications, the rugged Bray Series M1 metal seated ball valve utilizes a full port, solids-proof design to maximize refinery throughput. Backed by our dedicated severe service engineering team and Bray's global service department, the Series M1 is the ultimate solution for delayed coking isolation.

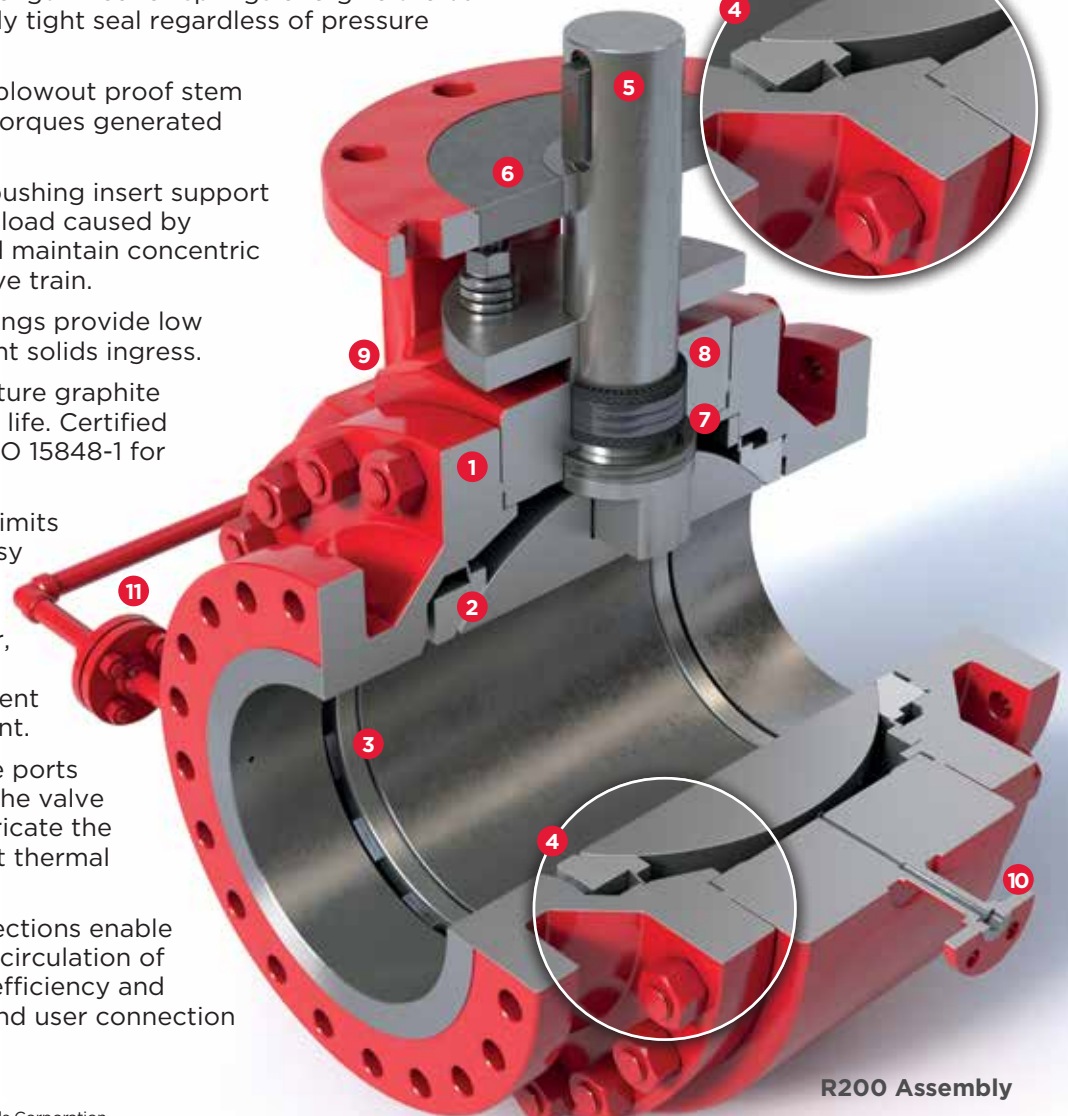
## Features:

- 1 Robust body construction exceeds ASME B16.34 wall thickness requirements. Fully enclosed body joints are protected from the process media and designed to ASME Section VIII, Div. 1, App. 2 (Pressure Vessel Code) providing superior sealing performance over many thermal cycles.
- 2 Self-cleaning seats wipe away coke deposits with each cycle for long-term tight sealing. Wide sealing surfaces enable even distribution of contact stress, extending valve life.
- 3 Proprietary mate-lapped hard coatings protect all sealing surfaces from abrasive media. Ball, seats and coating matched for CTE to ensure equal growth during thermal cycling.
- 4 Available R100 bidirectional and R200 unidirectional trims are specifically engineered to mitigate the impact of solids and thermal expansion on valve performance. All trims feature 100% metal-to-metal sealing for long-term, durable isolation. High strength Inconel® springs energize the ball and seats for a consistently tight seal regardless of pressure or temperature.
- 5 High strength, one-piece blowout proof stem sized to handle elevated torques generated by process media.
- 6 Outer stem bushing and bushing insert support the stem, counteract side load caused by orientation or cycling, and maintain concentric alignment of the stem drive train.
- 7 Lapped metal thrust bearings provide low friction sealing and prevent solids ingress.
- 8 Live loaded high temperature graphite packing for extended seal life. Certified to API 622, API 641 and ISO 15848-1 for low fugitive emissions.
- 9 Integral mounting flange limits hysteresis and enables easy direct-mount actuation. Factory equipped with industrial electric actuator, gear operator, or other customer specific equipment to ensure correct alignment.
- 10 Application specific purge ports prevent coke build-up in the valve cavity and seat areas, lubricate the ball and seats and prevent thermal shock.
- 11 Recirculation purge connections enable upstream or downstream circulation of steam improving energy efficiency and reducing the number of end user connection points required.

R100 Upstream Seat



R200 Upstream Seat



R200 Assembly

---

SINCE 1986, BRAY HAS PROVIDED FLOW CONTROL SOLUTIONS  
FOR A VARIETY OF INDUSTRIES AROUND THE WORLD.

VISIT **BRAY.COM** TO LEARN MORE ABOUT  
BRAY PRODUCTS AND LOCATIONS NEAR YOU.

## **HEADQUARTERS**

**Bray International, Inc.**

13333 Westland East Blvd.

Houston, Texas 77041

Tel: +1.281.894.5454

All statements, technical information, and recommendations in this bulletin are for general use only. Consult Bray representatives or factory for the specific requirements and material selection for your intended application. The right to change or modify product design or product without prior notice is reserved. Patents issued and applied for worldwide. Bray® is a registered trademark of Bray International, Inc.

© 2025 BRAY INTERNATIONAL, INC. ALL RIGHTS RESERVED. BRAY.COM

F-2815\_M1 Delayed Coking Guide\_20250623

---



**THE HIGH PERFORMANCE COMPANY**

**BRAY.COM**