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**SOLUTIONS FOR**  
**EMERGENCY SHUTDOWN**



# SAFETY SYSTEMS DEMAND RELIABILITY - BRAY CONTROL SOLUTIONS DELIVER

Automated isolation valves are a fundamental part of safety systems associated with oil and gas, utility and other hazardous processes. These valves are not intended for controlling the process itself but for providing personnel and asset protection.

In order to operate safely, facilities must evaluate their systems from a safety and isolation perspective. Risk scenarios are evaluated by the managers of the facility, and scrutinized by a risk management team typically from an insurance company.

The most critical scenarios are designated as (SIS) Safety Integrated Systems, and these systems must meet the highest reliability standards and certifications.

The key factor in evaluating these scenarios is isolation or containment. The read/reaction response must be programmed into the process control system. The process control system is the intelligence and automated isolation valving is the final control element to insure safe conditions.

In the aftermath of major calamities at process plants around the world, standards have been developed to insure proper safety protocols are employed.



IEC 61508 is an international standard for safety related systems which was published in 2010 and has become the standard in defining safety systems. The standard contains eight parts and Part 5 (IEC 61508-5) outlines requirements for ensuring that systems are designed, implemented, operated and maintained to provide the required Safety Integrity Level (SIL).

IEC 61511 *Functional Safety—Safety Instrumented Systems for the Process Industry Sector* was released in 2016, and adopted as the U.S. national standard, ISA-61511, in late 2017 by the ISA 84 committee.



SIL is a measure of risk reduction provided by a Safety Instrumented Function (SIF), based on four levels. Each level represents an order of magnitude of risk reduction. Every Safety Instrumented Function (SIF) has an assigned SIL.

Process plants, especially those handling flammable or hazardous media, designate certain valves in their system as:

- > Emergency Isolation Valves (EIV)
- > Emergency Block Valve (EBV)
- > Emergency Shutdown Valve (ESD) (ESDV).



## BRAY EMERGENCY SHUTDOWN VALVES FEATURE

- > **Tight Shut Off** - Tri Lok triple offset butterfly valves and Bray ball valves offer zero leakage performance.
- > **Fugitive Emissions** - Bray rotary isolation valves are certified to meet the requirements of API-641 Fugitive Emissions and ISO 15848-1.
- > **Fire Safe** - In the event of an emergency, process plants may be exposed to fire. Tri Lok and Bray valves are firesafe and certified to API-607.
- > **Fast Acting** - The Bray Series 98 scotch-yoke pneumatic and hydraulic actuators provide quick response when speed is critical in reducing the escalation of a hazard. The Bray Series 98 is capable of full-open to full-close in **less than one second**.
- > **Rugged Design** - The Bray Series 98 scotch-yoke actuators are designed for reliability and high cycle life and have been cycle tested to over 1 million cycles under load exceeding standards. (EN15714-3 Actuator Performance Standard).
- > **Customizable Configurations** - Bray offers application solutions to meet specific requirements with accessories like the Bray Valve Status Monitor, proximity sensors, smart positioners and solenoid valves.
- > **Manual and Automatic Release Options** - Provide flexibility on resumption of system operation after shutdown.
- > **Certified Safety Integrity Level (SIL) per IEC 61508** - Bray offers both valves and Series 98 scotch yoke actuators certified to SIL Level 3, including accessories.
- > **Partial Stroke Test** - Bray can provide both an electronic or mechanical partial stroke test to prevent and diagnose potential operational problems.

## TYPICAL EMERGENCY VALVE APPLICATIONS INCLUDE

- > **Pump Suction Isolation** - Pump suction fail closed if a pump seal blows out or has a leak.
- > **Compressor Suction Isolation** - Provides fail closed if the flammable gas compressor has to be isolated from the process.
- > **Compressor Discharge Isolation** - Provides sealing of the compressor outlet to isolate the compressor from back pressure from the gas pipeline.
- > **Flare Block Valve** - Emergency flare block valve fails open to release flammable gas to the flare. This valve is required to maintain zero leakage when it is closed which can be most of the time when the process is running.
- > **Turbine Trip Valve** - A turbine trip valve shuts off flow to the turbine to prevent damage to the turbine in an upset condition to prevent reverse flow.
- > **Over Pressure Protection Valve** - This process valve will fail open to prevent safety relief valves lifting.



# SERIES 98 ACTUATORS ARE DESIGNED WITH ESD FUNCTIONALITY IN MIND.

Bray's proprietary mechanical partial stroke device option allows ESD valve function verification without disruption of running process.

## HOW IT WORKS

With the hand lever set in free mode the push rod is free to move through the device allowing full range of travel. When the hand lever is activated the push rod travel is limited. This travel limit can be adjusted anywhere in the valve rotation profile.

## APPLICATION

By manually limiting the rotation of the valve to a small degree of movement the solenoid can be used to activate a partial stroke test. This test can be done at the unit by a technician without the use of outside electronics.



[For More Information Click Here](#)

**Hydraulic Dampener** - Series 98 scotch yoke actuator option provides adjustable cushion before valve seating preventing slamming and seat damage to the valve and vibration shock to the piping.

## HOW IT WORKS

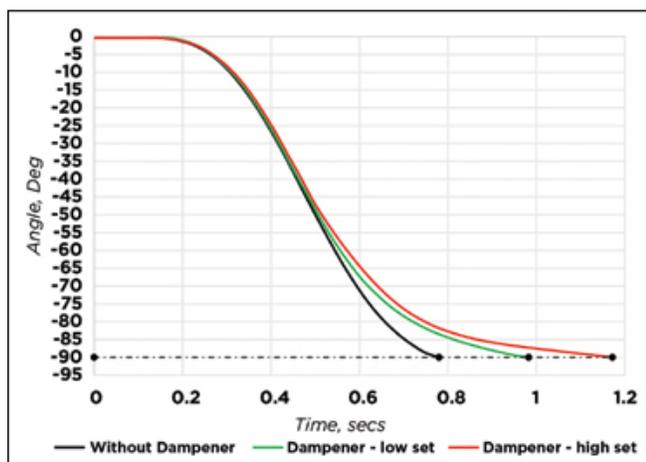
The hydraulic dampener functions by using a controlled rate of oil displacement in a closed loop. As the piston rod of the dampener is pressed down into the dampener's hydraulic cylinder, oil is displaced by the piston and forced through varying orifices that are progressively closed off as the piston strokes. This results in constant linear deceleration of the piston rod over its stroke.

## APPLICATION

By decelerating fast stroking valves, the forces of inertia are controlled, avoiding damage to valves, vibration and shock to piping and piping supports.



[For More Information Click Here](#)



Operating Time vs. Angle of Disc Rotation, Without and With Dampener (Example: Tri Lok Triple Offset Valve with Series 98 Spring-Return Pneumatic Actuator).

[For More Information Click Here](#)

## TRI LOK® TRIPLE OFFSET BUTTERFLY VALVES



<b>Size Range</b>	3" - 48" (80mm - 1200mm)
<b>Body Style</b>	Wafer   Lug   Flanged   Gate
<b>Temp. Range</b>	-320°F to 842°F (-196°C to 450°C)
<b>Pressure Ratings</b>	ASME Class 150, 300, 600, 900
<b>Shutoff Rating</b>	Zero Leakage
<b>Body Materials</b>	Carbon Steel   Stainless Steel
<b>Disc Seal Materials</b>	Carbon Steel   Stainless Steel
<b>Stem Materials</b>	17-4PH   410 Stainless Steel XM-19 (Nitronic®)
<b>Body Seat Materials</b>	316 Stainless Steel Hardened
<b>Seal Material</b>	318 Stainless Steel Duplex/Graphite
<b>Applications</b>	Refining   Petrochemical   Storage Tanks LNG   Chemical

The Tri Lok triple offset valve is the premier isolation valve for metal-to-metal sealing applications that require ZERO leakage. This field repairable design eliminates costly factory repairs and provides a lower total cost of ownership to our customers.

### FEATURES

- > Independently field replaceable seat and seal ring reducing maintenance, downtime and cost.
- > Nitride hardened seat eliminates the risk of seat and seal galling.
- > Bearing protection in stem journals minimize ingress of line media and particulates.
- > Field replaceable stem packing, rated to global low fugitive emissions standards.
- > Splined disc to stem connection, strongest connection available and provides superior control characteristics.
- > Triple offset geometry allows rotary engagement and disengagement of seat and seal ring without interference. Eliminates rubbing between the seat and seal ring.
- > Torque seated design to allow a metal-to-metal seal that allows ZERO leakage in the most demanding applications.

## BRAY TRUNNION MOUNTED BALL VALVES



<b>Size Range</b>	2" - 24" (50mm - 600mm)
<b>Body Style</b>	2 piece   3 piece
<b>Temperature. Range</b>	-50°F to 600°F (-45°C to 315°C)
<b>Pressure Ratings</b>	ASME Class 150   300   600
<b>Port</b>	Full
<b>End Connections</b>	Flanged   Butt Weld
<b>Body Materials</b>	ASTM A105   ASTM A350 Gr. LF2 ASTM A182 Gr F316
<b>Seat Materials</b>	RPTFE   Nylon   Devlon® PEEK   Tek-Fil®   TFM

### FEATURES

- > Primary o-ring stem seal prevents stem leakage in standard operating conditions. Secondary graphite packing ensures proper stem sealing per API 607 in extreme temperature scenarios.
- > Primary elastomeric seals ensure zero leakage in standard operating conditions. Secondary graphite seals ensure proper body joint sealing per API 607 in extreme temperature scenarios.
- > The proprietary energizer ring located above the primary o-ring stem seal provides insurance in the rare occasion the o-ring is damaged. The energizer ring would use the media pressure to create an upward compressive force on the packing. This upward force on the packing is combined with the downward compressive force created by tightening the packing gland. This results in a larger net compressive force on the packing and better seal than a typical packing design.
- > Emergency Stem Sealant Injection is a standard feature that allows the valve's stem housing to be adapted with a grease fitting to inject sealant during emergency scenarios. By filling the cavity between the stem and stem housing, this secondary stem seal provides protection against unplanned spikes in operating conditions.

**BRAY F15/F30  
FLANGED SERIES BALL VALVES**



<b>Size Range</b>	1/2" - 12" (12mm - 300mm) Custom and larger sizes available upon request
<b>Pressure Rating</b>	F15: ASME Class 150 F30: ASME Class 300
<b>Temp. Range</b>	-50°F to 650°F (-46°C to 343°C)
<b>Port</b>	Full Port
<b>Body Style</b>	Two piece
<b>End Connections</b>	Raised Face Flange (ASME B16.5 and EN 1092-1) Ring Type Joint (ASME B16.5)
<b>Body Materials</b>	Stainless Steel   Carbon Steel   Alloys
<b>Seat Materials</b>	Standard: TFM 1600 Optional: Tek-Fil®   Peek   RPTFE UHMWPE   Metal

Feature a floating ball design for low torque and increased cycle life. As standard, large size valves feature trunnion-type ball support. These rugged ball valves are ideal for industrial applications.

**FEATURES**

- > Smart Stem features live loaded packing that ensures tight stem packing sealing during changes in environmental conditions and long term wear of the valve.
- > Ball support on large sizes elevates the ball to allow for uniform contact with the downstream sealing seat ensuring tight sealing and long service life while preventing premature failure due to uneven wear.
- > Cavity fillers reduce entrapment of media in body cavity preventing solidifying media buildup and extending service life.

**BRAY  
SERIES M1 METAL SEATED BALL VALVES**



<b>Size Range</b>	1/2" - 36" (12mm - 900mm) Custom and larger sizes available upon request
<b>Pressure Rating</b>	ASME 150 - 4500 Custom higher pressures upon request
<b>Temp. Range</b>	Standard design rated up to 1100°F (593°C), can be customized for higher temperatures
<b>Port</b>	Full   Standard
<b>Body Style</b>	2 piece   3 piece
<b>End Connections</b>	Raised Face Flange (ASME B16.5 and EN 1092-1) Ring Type Joint (ASME B16.5) Butt Weld (ASME B16.25) Socket Weld

Bray's High Performance Series M1 Severe Service Metal Seated Ball Valves are suitable for the harshest applications. These products are customized as required for specific applications. Each M1 valve is engineered for the customer's specific application and is backed by a specialized and trained service department.

**FEATURES**

- > Maximum sealing life achieved through widest sealing surfaces and advanced coating technology.
- > A large spring washer stabilizes and locks the seat in place. These springs uniformly produce a consistent load around the entire seat ring and maintain a seal by loading the primary seat ring to the valve body.
- > Features a highly corrosion resistant super alloy, blowout proof, one-piece design.
- > Two coated inner stem bearing rings are used as thrust bearings for rotational movement. Gall resistant coatings are used to maximize bearing life. These rings are flat-lapped for low friction operation.

## VALVE AUTOMATION CENTER (VAC)

Your single source for turnkey automation solutions tailored to fit your applications. From valve and actuator sizing recommendations, to designing and modeling fully integrated controls packages, our application engineers are available to provide immediate technical expertise and support. The VAC follows stringent processes and quality standards, with a full traceability system of certificates, sizing calculations, data sheets, testing documentation, and checklists. Plus, all Bray products are backed by our three year warranty and worldwide support.



## CAPABILITIES AND SERVICES

- > Engineered solutions tailored for your unique application challenges.
- > Applications team on staff to provide immediate technical expertise and customer support.
- > Full integration, calibration, and testing of Bray and third party products, with complete documentation and traceability.
- > State of the art equipment with full assembly, testing, traceability, and documentation capabilities.

## SINGLE SOURCE SUPPLIER

- > Work with an industry leader with 30+ years of flow control experience.
- > Single point of contact simplifies decisions, saving time and money.
- > Faster quoting and specifications process.
- > Turnkey, fully-integrated and tested packages available.
- > Quick turnaround assembly, testing, and delivery of automated packages.
- > Value added services to support customers and end users



## TECHNICAL EXPERTISE

- > Sizing
- > Selection
- > Troubleshooting
- > Servicing
- > Complex Controls
- > Fail options
- > Speed Control
- > Overrides
- > Smart monitoring
- > Energy efficient
- > Volume tanks
- > Redundant circuits and accessories

## APPLICATION EXPERIENCE

Integrated solutions for various valve and automation applications, including:

- > Isolation
- > Emergency shutdown
- > Control
- > Modulating/throttling
- > High temperature
- > Cryogenic
- > Pressure swing absorption
- > Blowdown
- > Dribble control
- > Flare combustion
- > Molecular sieve
- > Fugitive emissions



# Bray is Engineering



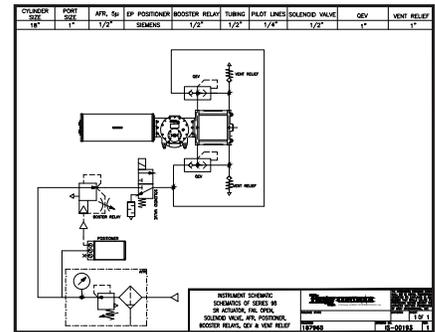
## QUALITY AND TESTING

- > **Valve** - All valves are pressure tested to 110% of rated pressure to assure zero-leakage.
- > **Actuator** - All actuators are calibrated and tested before shipment. Pneumatic actuators are also pressure tested to assure no leakage.
- > **Material Traceability** - Material certifications can be provided upon request for all valve pressure containing and valve pressure retaining components.
- > **Positive Material Identification (PMI)** - As required by PED, materials are subjected to PMI testing to verify material traceability certificates critical for ESD applications

## PROCESSES AND DOCUMENTATION

Stringent processes are followed and all required commercial/technical documents are provided, including:

- > Functional testing and records for all assemblies
- > Precise calculation sheets
- > Checklists
- > ISA data sheets
- > Traceability
- > Valve hydro-test certificates and full traceability records
- > MTRs
- > Drawings
- > Certificate of origin



## IN-HOUSE CAPABILITIES

- > Cryogenic Testing
- > 6,000 gallon liquid nitrogen tank
- > Certified Clean Room
- > Mass spectrometers
- > Stainless steel test boxes
- > Control panel with remote operation and monitoring



### US HEADQUARTERS

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