

## Materials Selection Guide – How to Use

**a) Corrosive Media Column** – All media are listed alphabetically. All oil, water, and planting solution media have been listed under their group heading for convenience. Some chemicals having a common laymen’s name have been referenced as such.

In a resilient seated butterfly like Bray’s design , the seat and disc are the only valve pans exposed to the line media. Bray’s selection of seat materials includes various elastomers and Teflon lined elastomers. The variety of disc materials includes metal and elastomer, nylon, or Teflon covered metals. Thus, to best analyze the materials offered for a particular media application, Bray has grouped the materials into two groups – disc materials and seat/disc materials. Please note that since Bray offers elastomers and Teflon as both a seat or as a covering for discs, we have called the second grouping seat/disc materials.

**b) Physical State Column** – This condition identifies the physical state of the corrosive media at room temperature as Gas, Liquid or Solid. **Note that almost all solids are conveyed in solution and only a few media such as cement, baking soda, flour, sugar, sulfur, etc. are pneumatically conveyed as solids.**

**c) Condition Column** – These columns define any unique condition parameters of the media for rating the materials. If no conditions are specified, it should be assumed the concentration is any level 0 – 100% and to allowable temperature is the seat material’s temperature rating except for nylon covered ductile iron. With regard to disc materials the nylon covered ductile iron disc is covered with Nylon 11. This material is rated for temperatures well over 200°F. For purposes of the Material Selection Guide, however, we have chosen to limit the A rating of Nylon covered discs in continual service to 140°F and would like to use nylon covered discs, please call Bray’s Inside Sales Department for further information on your specific application. For example:

Corrosive Media	Physical State	Disc Materials						Seat/Disc Materials						
		Condition	DI	NDI	Al Br	316 SS	Coating	Condition	EPDM	NBR	FKM	PTFE S20/21	PTFE S22/23	UHMWPE
Stannous Chloride	Solid		N	A*	N	A		<10%,<140°F	B	A*	A	A	A	A
Stannous Chloride	Solid							<10%,<140°F	B	A*	A	A	A	A

Since no conditions are specified for Disc Materials, one should assume nylon covered ductile iron is the recommended material for content temperatures up to 140°F, and 316 stainless steel above 140°F. Of course, Nylon 11 may actually be suitable for temperatures much greater than 140°F, as stated previously (see Technical Bulletin 1009, Nylon Coating Physical/Chemical Resistance Properties for additional information).

**d) Disc Materials and Seat/Disc Materials** – Under each grouping, the primary materials offered by Bray have been graded for their suitability to the media and conditions stated. The grading system is as follows:

A – Recommended, generally little or minor effect based on valve usage experience and recommendations from suppliers.

B – May sometimes be used depending upon the conditions of application such as concentration and temperature. Testing is recommended before full-scale usage.

N – Not recommended for usage.

Blank – Insufficient evidence available.

**e) Recommended Materials for Disc and Seat/Disc** – For each media and condition, we have placed an asterisk by the disc and seat material recommended by Bray. The material given an asterisk depends on two factors:

- 1) The material is rated A for compatibility with the media conditions;
  - 2) It is the most economical Bray material offered as a disc in combination with the most economical seat material.
- For example:

Corrosive Media	Physical State	Disc Materials						Seat/Disc Materials					
		Condition	DI	NDI	Al Br	316 SS	Coating	Condition	EPDM	NBR	FKM	PTFE S20/21	PTFE S22/23
Carbon Tetrachloride	Liquid	<75°	N	B	B	A*		N	N	N	B	A*	N

If the carbon tetrachloride for your media is <75°F, you must choose a 316 disc, not AB, because Bray does not offer an AB disc with a Teflon seat. If the temperature is >75°F, one should not assume we do not have a suitable valve material code. Remember, Bray carries EPDM, Buna-N, and Teflon molded disc-stems, thus one should select a Teflon disc stem and a Teflon seat for this application.

**f) Coating of Disc Materials** – When a disc coating is recommended, it will be noted in this column. The most economical Bray coating material will be noted with an asterisk. An example of reading the Material Selection Guide with a recommended disc coating is as follows:

Corrosive Media	Physical State	Disc Materials						Seat/Disc Materials						
		Condition	DI	NDI	Al Br	316 SS	Coating	Condition	EPDM	NBR	FKM	PTFE S20/21	PTFE S22/23	UHMWPE
Hydrochloric Acid	Liquid	<5%	N	A*	N	N		<15%, <75°F	A*	N	A	A	A	A
Hydrochloric Acid	Liquid	<5%	N	A*	N	N		<37%, <75°F	A*	N	B	A	A	A
Hydrochloric Acid	Liquid	<37%	N	B	N	N	EPDM	A*	N	N	N	B	A*	

If one has a concentration of Hydrochloric Acid less than 5% at any temperature, Bray recommends an NDI disc and EPDM seat. If the condition is a concentration less than 37% or more at any temperature, Bray recommends a Series 22/23 Teflon disc stem and seat, or a disc and stem that has EPDM coating.

## Bray Elastomer Description

The following is a general description of elastomers used by Bray.

Bray Elastomer Materials				
Material	Ethylene Propylene Diene Monomer	Butadiene Acrylo-Nitrile Copolymer	Teflon lined Ethylene Propylene Diene Monomer	FluoroElastomer
ASTM Designation	EPDM	NBR		FKM
Bray Reference	EPDM	Buna-N	PTFE	FKM
Temperature Rating	250°F to -40°F	212°F to 0°F	250°F to -20°F	400°F to 0°F
Food Grade	Yes	Yes	Yes	No

## Bray Metal and Nylon Covered Disc Description:

Material	Specific Reference
Ductile Iron	ASTM A536 65-45-12
Nylon Covered Ductile Iron	ASTM B148-954
Aluminum Bronze	ASTM A351 CF8M
316 Stainless Steel	