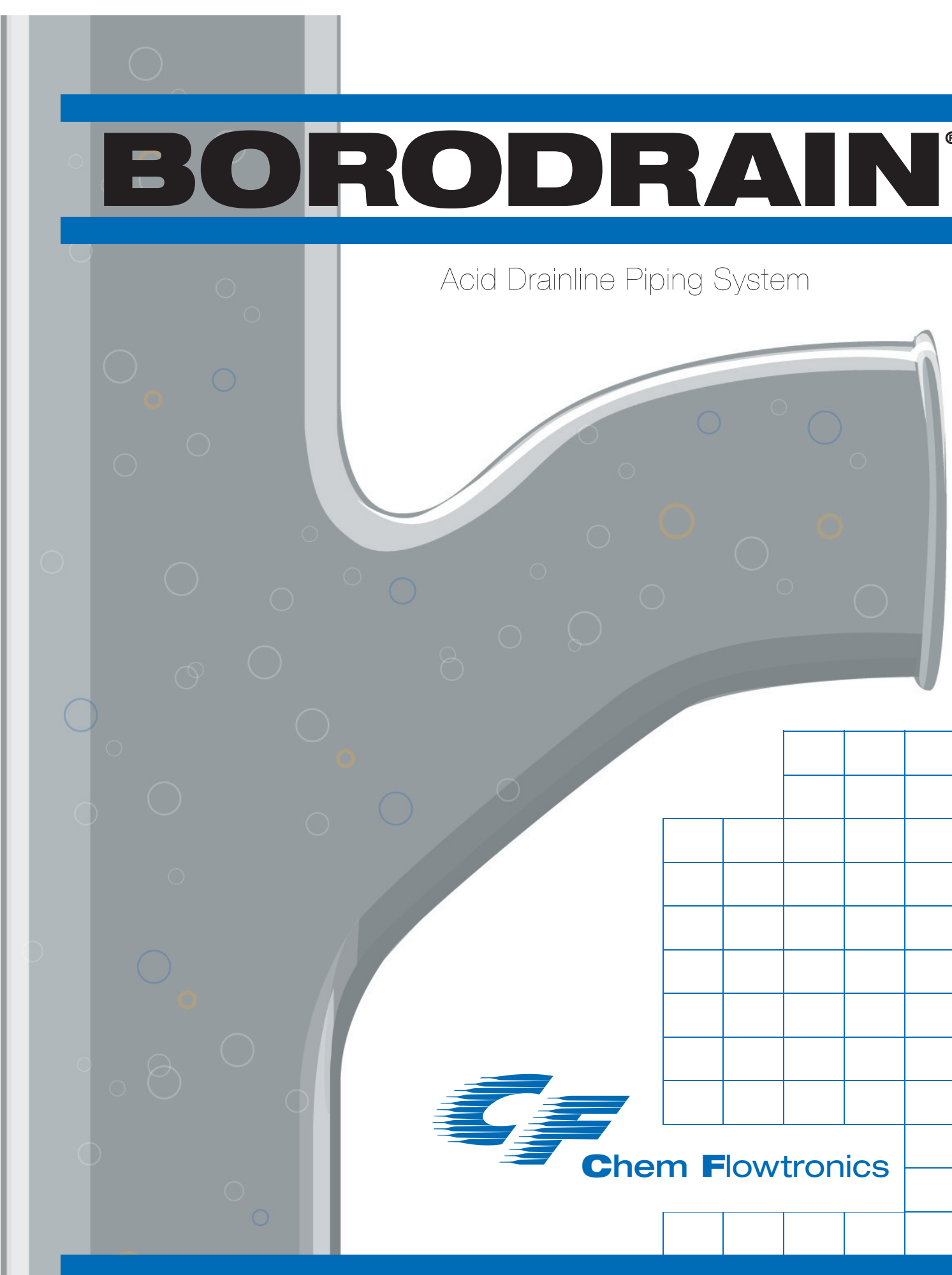
BORODRAIN®

Acid Drainline Piping System



Chem Flowtronics

BORODRAIN® Corrosion Resistance

Borosilicate glass is used as the material of choice in the chemical laboratory. Borosilicate glass remains today as the only material which is virtually impervious to all common chemicals and solvents at temperatures of 212°F and above.

BORODRAIN® Safety

Borodrain cannot burn. Therefore, it does not give off smoke or toxic vapor. It will not support combustion. It is the perfect material for safety minded.

BORODRAIN® Thermal Proporties

Thermal expansion is absolutely no problem when BORODRAIN glass is your material of construction. Expansion per 100ft line for example @150ºF:

BORODRAIN®	=	0.3"
Polypropylene	=	6.0"

Industry standards rate acid drainline systems to operate at a maximum working pressure of 15 psig. There is a safety factor built into the system to insure a leak free system.

The light weight **BORODRAIN®** System means fewer hangers are required, at least 50% fewer than other acid waste piping.

Couplings, are easy to install, easy to test, and provide positive leak free seals. The **BORODRAIN®** couplings require no lubricant or sealant during installation.

Couplings are manufactured with an series 300 stainless outer shell, rubber non wetted compression sleeve which provides compression and memory to the inert PTFE wetted internal seal ring. The bead to bead design or bead to plain end allows for easy installation.

Features & Benefits

BORODRAIN® glass piping systems are only 15% of the weight of high silica iron, and due to its rigidity, even at higher temperatures, **BORODRAIN®** requires half of the piping hangers of other materials. This translates into less cost from a reduction in both labor and materials.

Manufactured from borosilicate glass, drawn into various tubing sizes, **BORODRAIN®** systems are impervious to most corrosive chemicals. In fact acids that can destroy plastics systems have virtually NO effect on the **BORODRAIN®** system.

BORODRAIN® being manufactured from borosilicate glass is transparent, which enables the owners to check for blockages and or potential line issues prior to a major maintenance issue.

No expansion joints are required, due to the low thermal expansion of **BORODRAIN®** piping. Combined with the compression couplings which offers various degrees of deflection, further eliminates the need to install expansion joints.

BORODRAIN® systems are designed to operate at a maximum working pressure of 15 psig, however design pressures are higher. This safety factor will provide for years of reliable operation.

BORODRAIN® system is results of many years of Chem Flowtronics experience in glass process equipment for use in pharmaceutical, biotech and industrial applications.

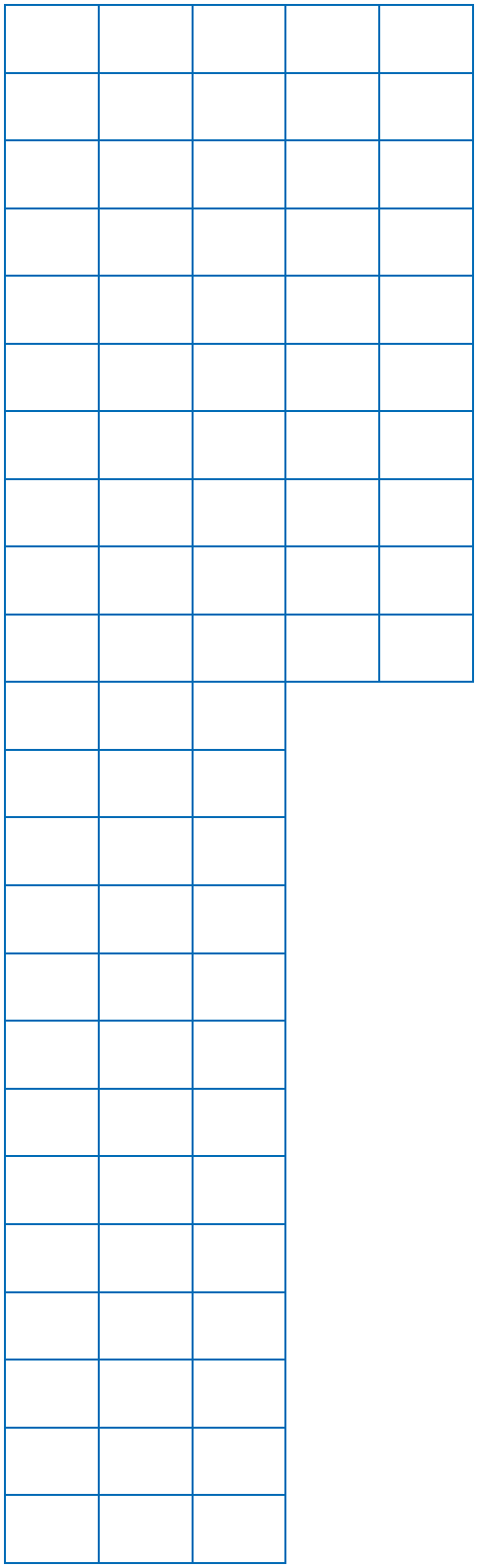
The dedicate personnel of **CHEM FLOWTRONICS**, some with over 40 years experience, combined with international sourcing, presented our company with a unique opportunity to offer a competitively priced, technically sound acid drainline system for the world markets.

While reviewing our **BORODRAIN®** catalog, note,that not all products are shown, please consult the factory for further information.

NOTE: Precautions should be observed when personnel or equipment are operating near glass pipe. Systems should be designed with built-in safety measures to limit the internal pressure of gases, which can have a high stored potential energy.

Drainline Coupling (Bead to Bead)

Drainline Coupling (Bead to Plain End)



BORODRAIN® Specification Guide

A. General

1. Contractor shall provide and install a complete **BORODRAIN®** acid drainline system as indicated. The system shall be made from borosilicate glass piping conforming to ASTM Specification C 1053-90, & ASTM C 1053-00, Federal Specification DD – G-541B, Military Specification MIL-P 22561 B (YD) Manufactured under the trade name **BORODRAIN®**, by **CHEM FLOWTRONICS**.

2. This acid drain line system shall include all glass items, pipe lengths, fittings, traps, compression PTFE lined couplings, and pipe supports, i.e. padded hangers.

3. When installing the **BORODRAIN®** piping system, pipe shall be installed free of mechanical strain/stress. Hangers on horizontal lines shall allow for limited side movement. Hangers placed on 8' to 10' centers. Vertical piping lines shall be supported by a padded riser clamp under the bottom-most coupling in the column. This riser clamp must restrict side as well as downward movement. Vertical stacks 3" diameter or larger shall be supported at every floor, where as below 3" pipe shall be supported at every other floor level.

B. Buried Lines

1. Excavation shall conform to National Plumbing Code A40.8 Section 2.7. The bottom of the trench shall be supported throughout its entire length. Underground glass pipe shall be protected with an expanded polystyrene shield. Fittings shall be wrapped in polyvinyl film (5mil minimum), Scotch Wrap or J.M. Trans-Tex. Trenches shall be back filled with sand or rock free soil. Hand tamp to 12" above the top of the pipe. If a 12" minimum cover is not possible, additional protection against crushing must be provided.

C. System Connections

1. All glass to glass connections shall be made with **BORODRAIN®** bead to bead or bead to plain end compression couplings. Coupling construction of 300 series outer shell, Buna-N liner support, and PTFE wetted gasket seal area.

2. All other joints between glass and other types of piping material shall be made with **BORODRAIN®** adapters.

D. Wall and Floor Penetrations

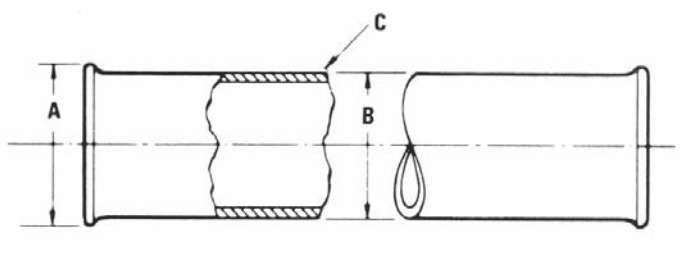
1. Glass pipe passing through walls or floor slabs hall be fitted with pipe sleeves minimum of 2" greater diameter than the glass pipe. The annular space between the pipe and sleeve shall be filled with fiberglass insulation or with a non-hardening approved caulking material.

2. Glass pipe shall not be installed in direct contact with concrete.

3. Glass pipe shall be protected from weld splatter or any foreign object, which could damage the outer surface of the glass pipe.

Standard Length Pipe

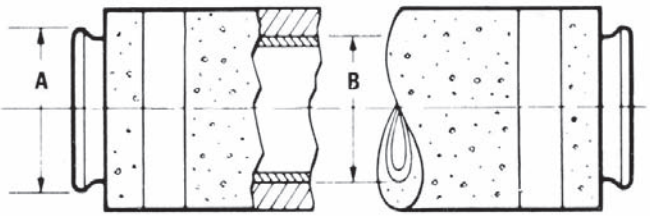
Size	Weight lbs./ft.	A	B (O.D.)	C (Wall)	5' Length	10' Length
1½	0.87	2.25	1.82	0.177	BD-PIPE-15-5	BD-PIPE-15-10
2	1	2.60	2.32	0.196	BD-PIPE-20-5	BD-PIPE-20-10
3	2.0	3.65	3.42	0.20	BD-PIPE-30-5	BD-PIPE-30-10
4	3.1	4.88	4.52	0.218	BD-PIPE-40-5	BD-PIPE-40-10
6	6.0	7.10	6.42	0.299	BD-PIPE-60-5	BD-PIPE-40-10



Underground Pipe

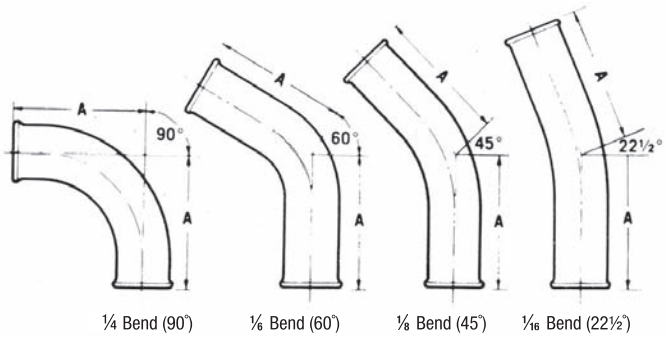
A	B (O.D.)	5' Only
2.25	1.82	BD-PIPE-15-5UG
2.60	2.32	BD-PIPE-20-5UG
3.65	3.42	BD-PIPE-30-5UG
4.88	4.52	BD-PIPE-40-5UG
7.10	6.42	BD-PIPE-60-5UG

Expanded Polystyrene



Sweeps

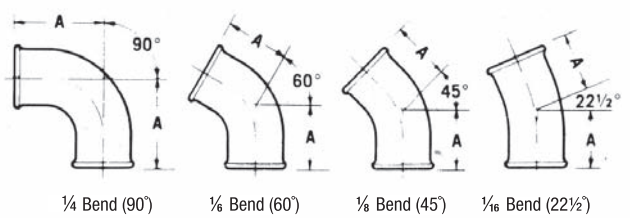
Size	A	90°	60°	45°	22½°
1½	4½	BD-SW90-15	BD-SW60-15	BD-SW45-15	BD-SW22-15
2	5	BD-SW90-20	BD-SW60-20	BD-SW45-20	BD-SW22-20
3	6½	BD-SW90-30	BD-SW60-30	BD-SW45-30	BD-SW22-30
4	9	BD-SW90-40	BD-SW60-40	BD-SW45-40	BD-SW22-40
6	12	BD-SW90-60	BD-SW60-60	BD-SW45-60	BD-SW22-60



NOTE: Drawings reflect layout dimensions, gasket thickness allowance is included.

Bends

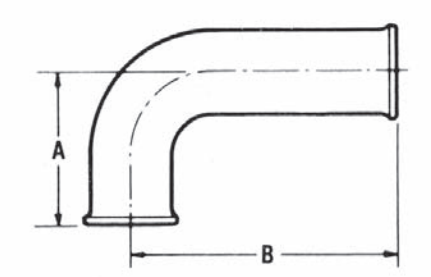
Size	A 90°	A 60°	A 45°	A 22½°	90°	60°	45°	22½°
1½	3	2½	2	2	BD-BE90-15	BD-BE60-15	BD-BE45-15	BD-BE22-15
2	3¼	2¾	2¼	2¼	BD-BE90-20	BD-BE60-20	BD-BE45-20	BD-BE22-20
3	5	3½	2¾	2¾	BD-BE90-30	BD-BE60-30	BD-BE45-30	BD-BE22-30
4	7	4½	3¼	3¼	BD-BE90-40	BD-BE60-40	BD-BE45-40	BD-BE22-40
6	—	—	7	—	BD-BE90-60	BD-BE60-60	BD-BE45-60	BD-BE22-60



¼ Bend (90˚) ⅛ Bend (60˚) ⅛ Bend (45˚) 1⁄16 Bend (22½˚)

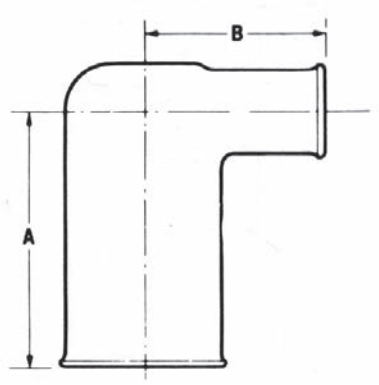
Long 90° Bends

Size	A	B	90°
1½-90°	3⅜	6	BD-SW90-15L
2-90°	3⅝	7½	BD-SW90-20L



6 Quarter Bend Reducers

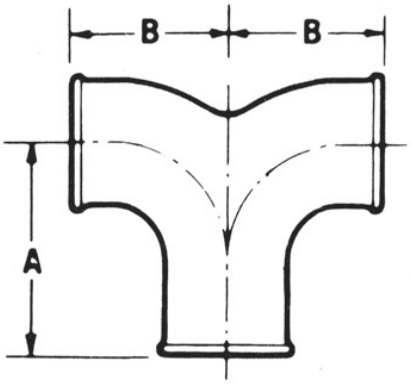
Size	A	B	90°
2 x 1½	4	3½	BD-QBRE-2015
3 x1½	5	4	BD-QBRE-3015
3 x2	5	4½	BD-QBRE-3020
4 x1½	7	4½	BD-QBRE-4015
4 x2	7	5	BD-QBRE-4020
4 x3	7	5½	BD-QBRE-4030
6 x1½	9	5½	BD-QBRE-6015
6 x2	9	6	BD-QBRE-6020
6 x3	9	6½	BD-QBRE-6030
6 x4	9	8	BD-QBRE-6040



Double Quarter Bends

Size	A	B	
1½	3	2⅛	BD-DQBE-1500
*2 x 2 x 1½	3¼	2¼	BD-DQBE-2015
2	3½	2¼	BD-DQBE-2020
3	5	4½	BD-DQBE-3000
4	6½	5¾	BD-DQBE-4000
6	8½	7	BD-DQBE-6000

*Branch is 1½" I.D.



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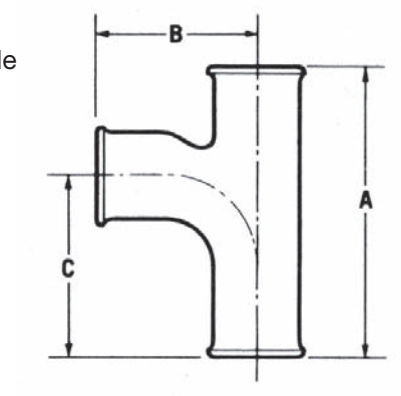
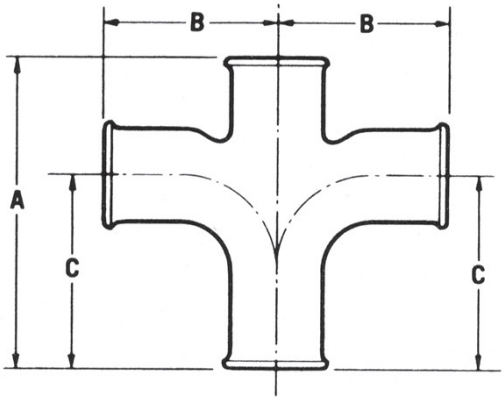
Single Sanitary Tee

Size	A	B	C	Single	Double
1½ x 1½	6	3½	3¾	BD-SSAT-1515	BD-DSAT-1515
2 x 1½	8	3¾	5	BD-SSAT-2015	BD-DSAT-2015
2 x 2	8	4½	5	BD-SSAT-2020	BD-DSAT-2020
3 x 1½	12	4¼	7 7/16	BD-SSAT-3015	BD-DSAT-3015
3 x 2	12	5	7 7/16	BD-SSAT-3020	BD-DSAT-3020
3 x 3	12	6⅜	7 7/16	BD-SSAT-3030	BD-DSAT-3030
4 x 1½	14	4⅞	8¾	BD-SSAT-4015	BD-DSAT-4015
4 x 2	14	5⅝	8¾	BD-SSAT-4020	BD-DSAT-4020
4 x 3	14	7	8¾	BD-SSAT-4030	BD-DSAT-4030
4 x 4	14	8¼	8¾	BD-SSAT-4040	BD-DSAT-4040
6 x 2	20	6¾	12⅜	BD-SSAT-6020	BD-DSAT-6020
6 x 3	20	8	12⅜	BD-SSAT-6030	BD-DSAT-6030
6 x 4	20	9 5/16	12⅜	BD-SSAT-6040	BD-DSAT-6040
6 x 6	20	12	12⅜	BD-SSAT-6060	BD-DSAT-6060

Single

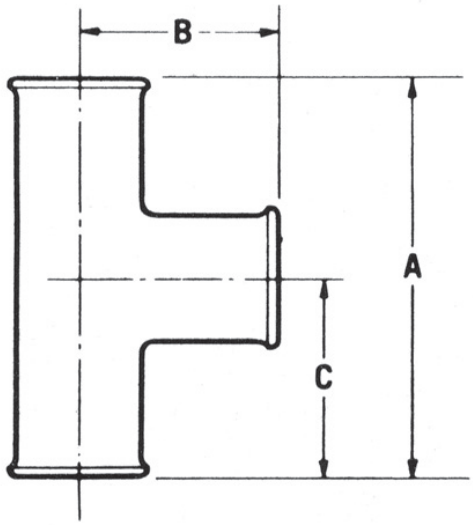


Double



Straight T

Size	A	B	C	
1½ x 1½	6	3	3	BD-STRT-1515
2 x 1½	8	3¼	4	BD-STRT-1520
2 x 2	8	4	4	BD-STRT-2020
3 x 1½	12	4½	6	BD-STRT-3015
3 x 2	12	4½	6	BD-STRT-3020
3 x 3	12	6	6	BD-STRT-3030
4 x 1½	14	5	7	BD-STRT-4015
4 x 2	14	5	7	BD-STRT-4020
4 x 3	14	6½	7	BD-STRT-4030
4 x 4	14	8	7	BD-STRT-4040
6 x 3	20	7¾	10	BD-STRT-6030
6 x 4	20	9	10	BD-STRT-6040
6 x 6	20	10	10	BD-STRT-6060

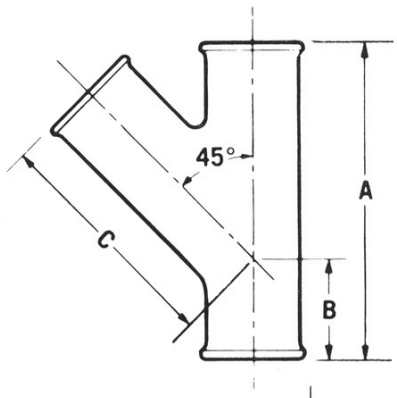


NOTE: Drawings reflect layout dimensions, gasket thickness allowance is included.

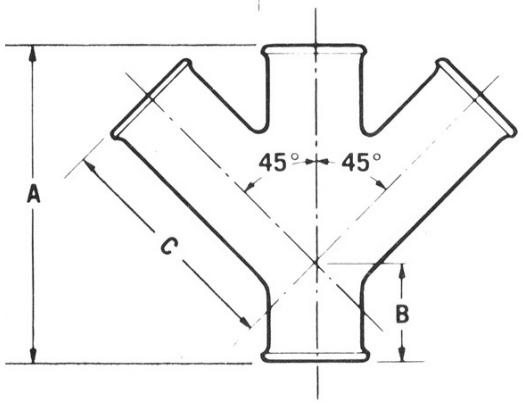
Drainline Y

Size	A	B	C	Single Y	Double Y
1½ x 1½	6	1⅞	4½	BD-DRYS-1515	BD-DRYD-1515
2 x 1½	8	2½	4¾	BD-DRYS-2015	BD-DRYD-2015
2 x 2	8	2½	6	BD-DRYS-2020	BD-DRYD-2020
3 x 1½	12	3¾	5½	BD-DRYS-3015	BD-DRYD-301
3 x 2	12	3¾	6¾	BD-DRYS-3020	BD-DRYD-3020
3 x 3	12	3¾	8	BD-DRYS-3030	BD-DRYD-3030
4 x 1½	14	4½	6⅜	BD-DRYS-4015	BD-DRYD-4015
4 x 2	14	4½	7½	BD-DRYS-4020	BD-DRYD-4020
4 x 3	14	4½	8¾	BD-DRYS-4030	BD-DRYD-4030
4 x 4	14	4½	10	BD-DRYS-4040	BD-DRYD-4040
6 x 2	20	5¾	9	BD-DRYS-6020	BD-DRYD-6020
6 x 3	20	5¾	10⅜	BD-DRYS-6030	BD-DRYD-6030
6 x 4	20	5¾	11½	BD-DRYS-6040	BD-DRYD-6040
6 x 6	20	5¾	14	BD-DRYS-6060	BD-DRYD-6060

Single



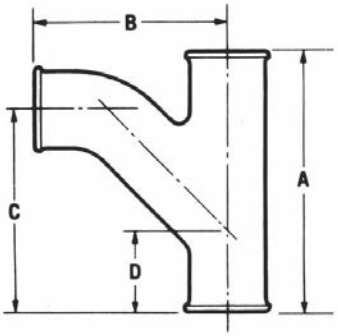
Double



Combination Y and ⅛ Bend

Size	A	B	C	D	Single Y	Double Y
1½ x 1½	6	4½	4⅝	1⅞	BD-WYES-1515	BD-WYED-1515
2 x 1½	8	4¾	5½	2½	BD-WYES-2015	BD-WYED-2015
3 x 1½	12	5⅝	7¼	3¾	BD-WYES-3015	BD-WYED-3015
3 x 2	12	6½	8	3¾	BD-WYES-3020	BD-WYED-3020
3 x 3	12	8½	9	3¾	BD-WYES-3030	BD-WYED-3030
4 x 1½	14	6	8½	4½	BD-WYES-4015	BD-WYED-4015
4 x 2	14	7	9¼	4½	BD-WYES-4020	BD-WYED-4020
4 x 3	14	9	10¼	4½	BD-WYES-4030	BD-WYED-4030
4 x 4	14	11	11	4½	BD-WYES-4040	BD-WYED-4040
6 x 2	20	8¼	11⅝	5¾	BD-WYES-6020	BD-WYED-6020
6 x 3	20	10	12½	5¾	BD-WYES-6030	BD-WYED-6030
6 x 4	20	12	13½	5¾	BD-WYES-6040	BD-WYED-6040
6 x 6	20	15	14½	5¾	BD-WYES-6060	BD-WYED-6060

Single



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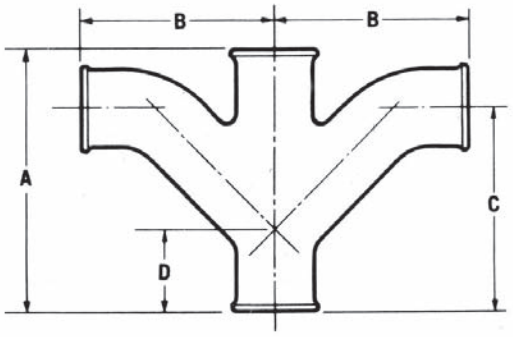
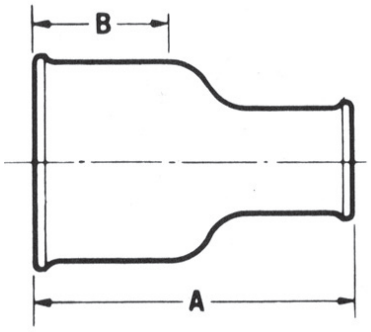


NOTE: Drawings reflect layout dimensions, gasket thickness allowance is included.

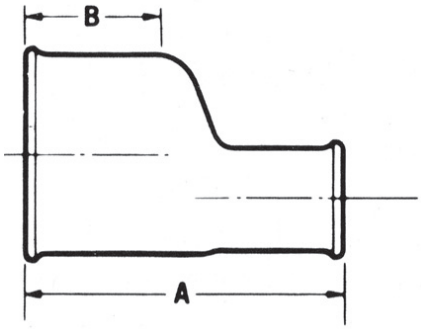
Straight Reducers

Size	A	B	Straight	Eccentric
2 x 1½	4	1¾	BD-CORE-2015	BD-ECRE-2015
3 x 1½	5	2¼	BD-CORE-3015	BD-ECRE-3015
3 x 2	5	2¼	BD-CORE-3020	BD-ECRE-3020
4 x 1½	7	3	BD-CORE-4015	BD-ECRE-4015
4 x 2	7	3	BD-CORE-4020	BD-ECRE-4020
4 x 3	7	3	BD-CORE-4030	BD-ECRE-4030
6 x 1½	9	4	BD-CORE-6015	BD-ECRE-6015
6 x 2	9	4	BD-CORE-6020	BD-ECRE-6020
6 x 3	9	4	BD-CORE-6030	BD-ECRE-6030
6 x 4	9	4	BD-CORE-6040	BD-ECRE-6040

Straight

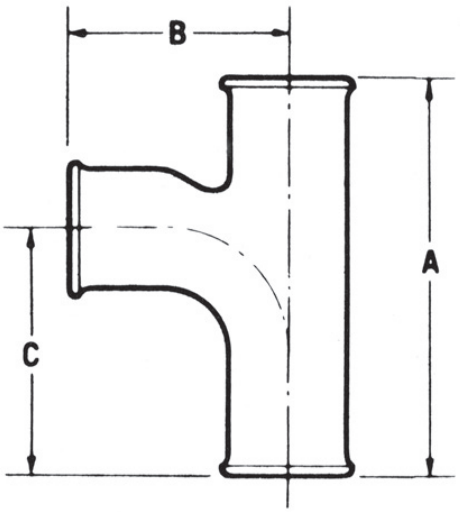


Eccentric



Compact Single Sanitary Tee

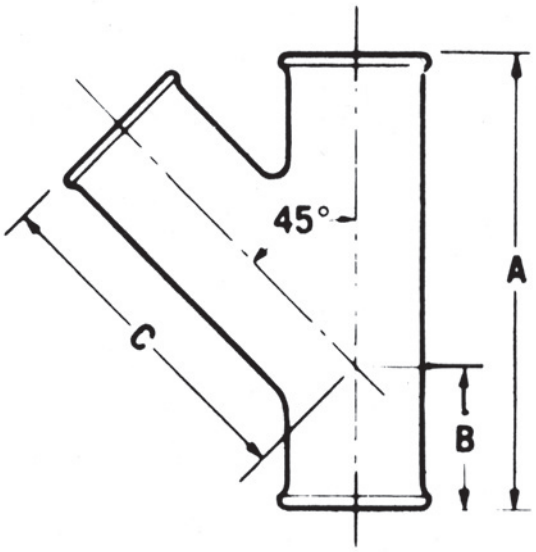
Size	A	B	C	
1½ x 1½	4½	2⅛	2¼	BD-CSST-1515
2 x 1½	4¾	2⅜	2⅜	BD-CSST-2015
2 x 2	5⅜	2¾	2¾	BD-CSST-2020
3 x 2	9	4 1/16	5 1/16	BD-CSST-3020
3 x 3	9	4 1/16	5 1/16	BD-CSST-3030
4 x 1½	10	4⅝	6⅜	BD-CSST-4015
4 x 2	10	4⅞	6⅜	BD-CSST-4020
4 x 3	10	5⅜	6⅛	BD-CSST-4030
4 x 4	10	6¼	6⅛	BD-CSST-4040
6 x 2	16	5⅞	9½	BD-CSST-6020
6 x 3	16	6¾	9½	BD-CSST-6030
6 x 4	16	7⅞	9½	BD-CSST-6040
6 x 6	16	9⅞	9¼	BD-CSST-6060



NOTE: Drawings reflect layout dimensions, gasket thickness allowance is included.

Compact Single Drainline Y

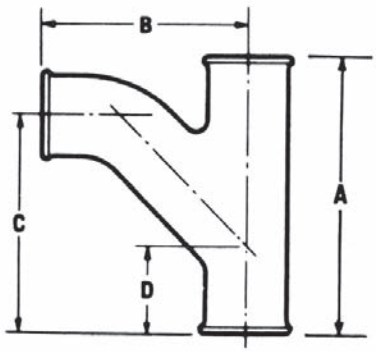
Size	A	B	C	
1½ x 1½	5⅜	1⅛	4	BD-CSDY-1515
2 x 2	5⅞	1¼	4⅝	BD-CSDY-2020
3 x 2	9	2⁹⁄₁₆	6⁵⁄₁₆	BD-CSDY-3020
3 x 3	9	2⁹⁄₁₆	7¹⁄₁₆	BD-CSDY-3030
4 x 1½	10	3⅛	6¼	BD-CSDY-4015
4 x 2	10	2⅞	7¾	BD-CSDY-4020
4 x 3	10	2	8⅛	BD-CSDY-4030
4 x 4	10	2	8⅜	BD-CSDY-4040
6 x 2	16	4⅞	9⅞	BD-CSDY-6020
6 x 3	16	5⅛	10⅜	BD-CSDY-6030
6 x 4	16	4½	11⅝	BD-CSDY-6040
6 x 6	16	4⅝	12⅝	BD-CSDY-6060



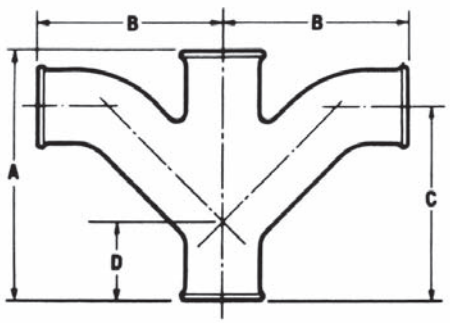
Combination Y and ⅛ Bend and Double Combination Y and ⅛ Bend

Size	A	B	C	D	Single	Double
1½ x 1½	5⅛	3¾	3¾	1⁵⁄₁₆	BD-CYES-2015	BD-CYED-2015
2 x 2	6	4⅜	4⅝	1½	BD-CYES-2020	BD-CYED-2020
3 x 2	9	6¹⁄₁₆	6⁹⁄₁₆	2¾	BD-CYES-3020	BD-CYED-3020
3 x 3	9	6¹⁄₁₆	6¹¹⁄₁₆	2¼	BD-CYES-3030	BD-CYED-3030
4 x 1½	10	5⅜	6⅜	2⅞	BD-CYES-4015	BD-CYED-4015
4 x 2	10	5⅜	6⅜	2⅞	BD-CYES-4020	BD-CYED-4020
4 x 3	10	6⅝	7⅝	3⅛	BD-CYES-4030	BD-CYED-4030
4 x 4	10	6⅞	7⅜	2¹⁄₁₆	BD-CYES-4040	BD-CYED-4040
6 x 2	16	7⅝	9⅝	4⅝	BD-CYES-6020	BD-CYED-6020
6 x 3	16	8⅛	9⅝	4¾	BD-CYES-6030	BD-CYED-6030
6 x 4	16	9⅛	10⅜	4⅝	BD-CYES-6040	BD-CYED-6040
6 x 6	16	11¼	10⅛	3½	BD-CYES-6060	BD-CYED-6060

Combo Y + ⅛ Bend



Double Combo Y + ⅛ Bend

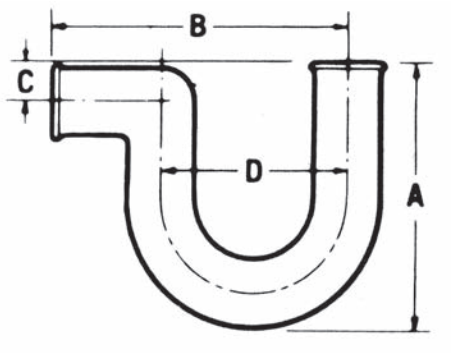


NOTE: Drawings reflect layout dimensions, gasket thickness allowance is included.

Trap-P Style

Size	A	B	C	D	
1½ x 1½	7	8	1	5	BD-PTRP-1515
*2 x 1½	8	8	1½	5	BD-PTRP-2015
*2 x 2	8 3/16	8¾	1½	5½	BD-PTRP-2020
3 x 3	10¼	10½	2	6½	BD-PTRP-3030
4 x 4	12¼	12½	2½	7½	BD-PTRP-4040
6 x 6	18⅛	31	3⅜	24	**BD-PTRP-6060

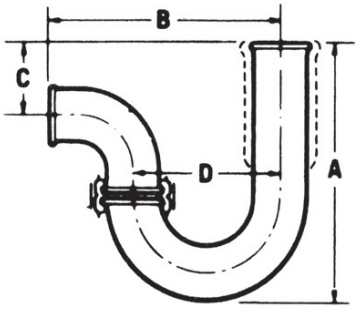
*Use Adapter Coupling for Inlet Joint. ** No Cleanouts on 6 x 6 Traps



Swivel Trap-P Style Outlet "Short"

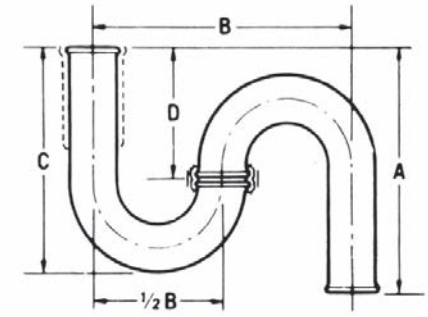
Size	A	B	C	D	
1½ x 1½	8¾	8	2	5	BD-STPS-1515-SO
2 x 1½	8¾	8	2	5	BD-STPS-2015-SO
2 x 2	9 11/16	8¾	1⅝	5½	BD-STPS-2020-SO

NOTE: Long and Plain End Available



Swivel Trap-S Style

Size	A	B	C	D	
1½ x 1½	10	10	8¾	5	BD-STSS-1515
2 x 1½	10	10	8¾	5	BD-STSS-2015
2 x 2	9¾	11	9 11/16	4⅞	BD-STSS-2020



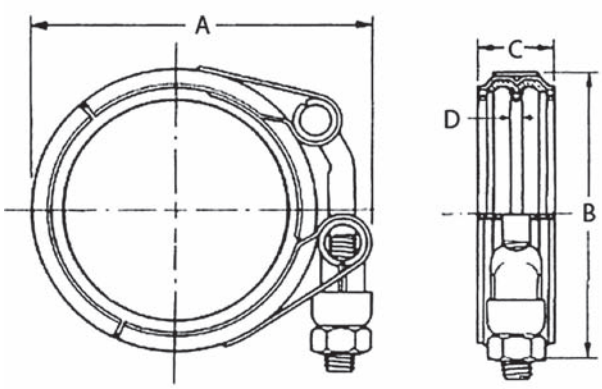
Cleanout Plug

Size	A	
1½	1	BD-PLUG-1500
2	1	BD-PLUG-2000
3	1⅛	BD-PLUG-3000
4	1¼	BD-PLUG-4000
6	1½	BD-PLUG-6000

NOTE: Drawings reflect layout dimensions, gasket thickness allowance is included.

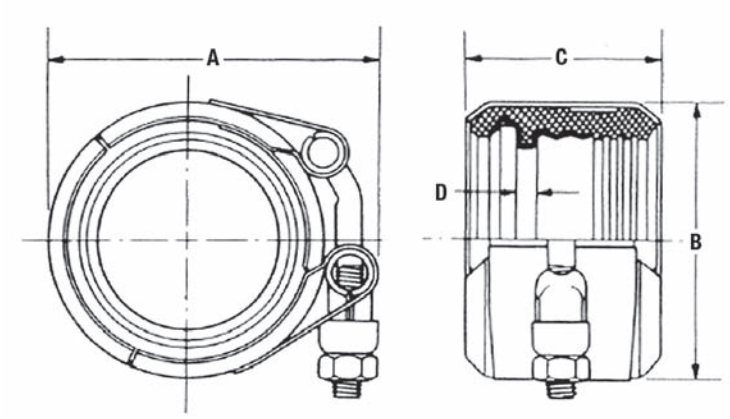
Drainline Coupling Bead to Bead

Size	A	B	C	D	
1½	3	2⅝	1⅜	3/16	BD-CGBB-1500
2	3½	3⅛	1⅜	3/16	BD-CGBB-2000
3	4¾	4¼	1½	3/16	BD-CGBB-3000
4	6	5½	1⅝	3/16	BD-CGBB-4000
6	8¼	7¾	1⅞	¼	BD-CGBB-6000



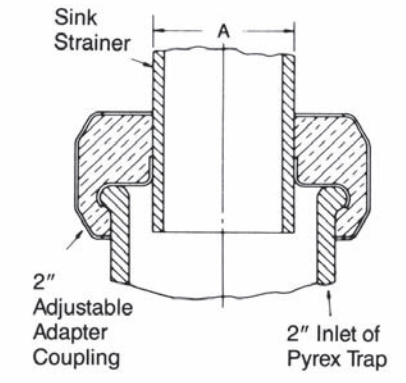
Drainline Coupling Bead to Plain End

Size	A	B	C	D	
1½	3¼	2½	1¾	5/32	BD-CGBP-1500
2	3¾	3	1¾	5/32	BD-CGBP-2000
3	4⅞	4⅛	2½	5/32	BD-CGBP-3000
4	6⅛	5⅜	2½	5/32	BD-CGBP-4000
6	8 7/16	7⅝	4⅛	5/32	BD-CGBP-6000



Adapter Coupling

Size	O.D. Range A	
2 x 1¾	1.70 – 1.78	BD-ADCO-2017
2 x 1½	1.48 – 1.53	BD-ADCO-2015



NOTE: Drawings reflect layout dimensions, gasket thickness allowance is included.

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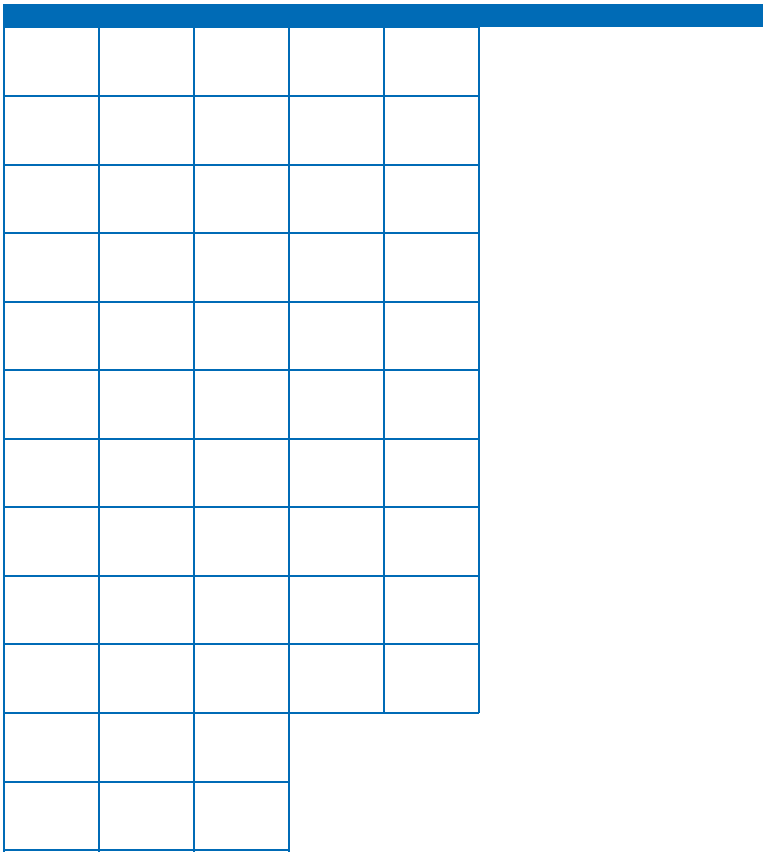

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