



# Long and Short Radius Elbows

Pipe and tube bends of up to 180 degrees are readily available in carbon steel, aluminum, stainless steel and galvanized steel in the sizes listed below. Other centerline radii are available but not shown. Special shapes, "U" bends, offsets, and bifurcated bends available upon request, in addition to many other sizes and dimensions.

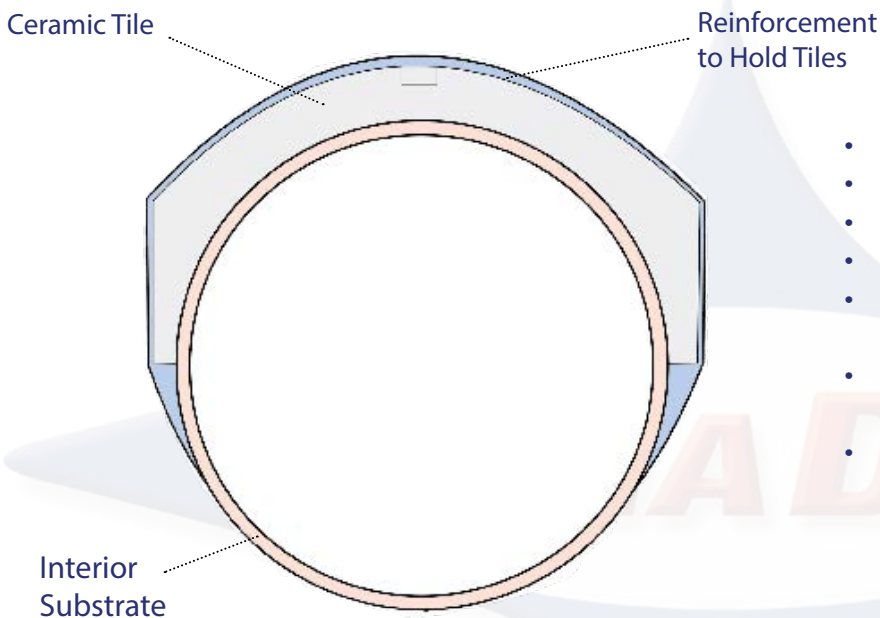


Tube Size	Pipe Size	Outside Diameter	Common Centerline Radii (CLR) Inches	Standard Tangent
1"		1"	3, 4, 6, 12	4"
	1"	1.315"	3, 5	4"
1 1/4"		1.25"	3, 7.25	4"
	1 1/4"	1.660"	3.5, 4, 6.25	4"
1 1/2"		1.5"	2.5, 6, 7.5, 9, 12, 15, 18, 24, 30, 36	4"
1 3/4"		1.75"	2.5, 8, 9, 12, 15, 24, 30, 36, 48	4"
	1 1/2"	1.9"	5, 6, 7.5, 9, 10, 12, 18, 24, 30, 36, 48	4"
2"		2"	2.5, 3, 3.5, 4, 5, 6, 8, 8.5, 9, 10, 12, 15, 18, 24, 30, 36, 48	4"
2 1/8"		2.125"	3, 5, 12, 24, 30, 36	4 1/4"
2 1/4"		2.25"	3, 9, 12, 15, 17, 24, 30, 36	4 1/2"
	2"	2.375"	6, 7.5, 10, 12, 15, 17, 24, 30, 36, 48	4"
2 1/2"		2.5"	4, 6, 9, 12, 15, 17, 24, 30, 36, 48	5"
2 3/4"		2.75"	2.75, 4, 17, 30, 36, 48	5 1/2"
	2 1/2"	2.875"	12, 12.5, 15, 17, 24, 30, 36, 60	5"
3"		3"	4, 4.5, 7.5, 9, 10, 12, 15, 18, 24, 30, 36, 48, 60	6"
3 1/4"		3.25"	17, 30, 36	6 1/2"
3 1/2"	3"	3.5"	3.5, 4.5, 6, 8.75, 12, 15, 16, 18, 24, 30, 36, 48	7" (6" pipe)
3 3/4"		3.75"	17, 24, 32, 36	7 1/2"
4"	3 1/2"	4"	4, 5, 6, 7.75, 10, 12, 16, 18, 20, 24, 30, 32, 36, 48, 60	8" (7" pipe)
4 1/4"		4.25"	16, 30, 36, 48, 60	8 1/2"
4 1/2"	4"	4.5"	6, 9, 12, 16, 18, 20, 24, 30, 32, 36, 48, 60	9" (8" pipe)
4 3/4"		4.75"	36	9 1/2"
5"		5"	5.5, 7.5, 12.5, 17, 22, 24, 30, 36, 42, 48, 60	10"
	5"	5.563"	15, 20, 24, 30, 36, 42, 48, 60, 72	10"
5 1/2"		5.5"	30, 36	11"
6"		6"	9, 15, 18, 24, 30, 36, 42, 48, 60, 72	12"
	6"	6.625"	18, 24, 30, 36, 42, 48, 60, 72	12"
8"		8"	12, 20, 32, 48, 60, 72	16"
	8"	8.625"	24, 32, 40, 42, 48, 60, 72	16"
	10"	10.75"	40, 48, 50	20"

## Cast-Back® Elbow

Designed and manufactured to withstand the impact of large particle pneumatic conveying, the patented Cast-Back® elbow offers superior product protection. The elbow has a 3/4" thick interlocking back tile, which also offers additional 1/4" thick side protection.

### Cross-Section of Cast-Back® Elbow

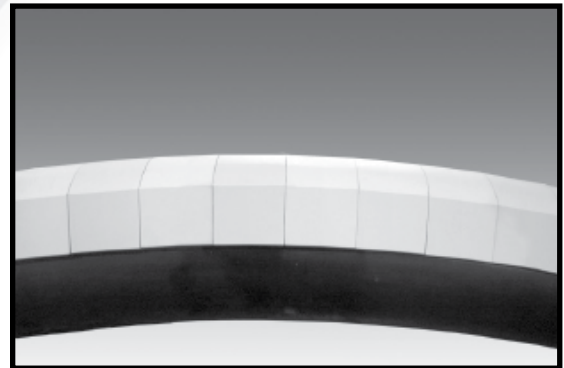


- Highly Abrasion Resistant
- Impact Resistant
- Easily replaces existing elbows
- Does not change line flow
- Available in any degree & most standard CLR's
- Available in CS, SS, Alum, and Galvanized
- Available in Pipe or Tube

Available in plain ends, flanged ends, grooved ends, or other specified ends. Special orders are welcome.

Available in 2", 3", 4", & 5" pipe sizes

Available in 3" & 4" tube sizes



\*tiles shown here without exterior reinforcement



## Ceram-Back<sup>®</sup> Elbow

Designed to eliminate unwanted costs such as maintenance, loss of material, and down time, the Ceram-Back<sup>®</sup> elbow replaces the conventional elbow and is manufactured to remain in a system much longer - thus, reducing costs and raising production.

The Ceram-Back<sup>®</sup> elbow has a jacket across the back of the core elbow which is approximately 1/2" of ceramic compound. This compound has a Mohs hardness of 9+, second only to diamond, which has a Mohs hardness of 10. The ceramic jacket and core elbow is then wrapped with an exterior material to maintain hoop strength. Once the core elbow has worn through, the abrasion is then transferred to the ceramic outer jacket. The metal core also acts as a static conductor.

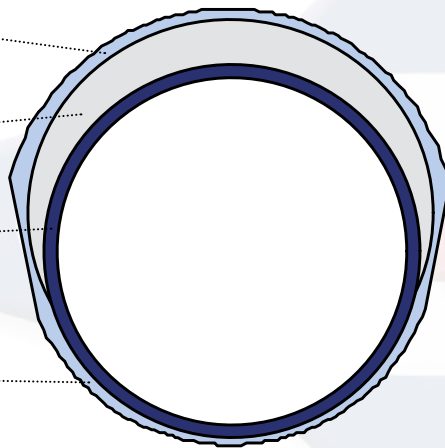
### Cross-Section of Ceram-Back<sup>®</sup> Elbow

Outside Radius of Elbow

Ceramic Compound

Interior Substrate

Reinforcement to Maintain Hoop Strength



- Abrasion Resistant
- Easily replaces existing elbows
- Does not change line flow
- Available in any degree & CLR
- Available in CS, SS, Alum, and Galvanized
- Available in Pipe or Tube

Available in plain ends, flanged ends, grooved ends, or other specified ends. Special orders are welcome.





## Replaceable-Back Elbow



Cross Section of Elbow

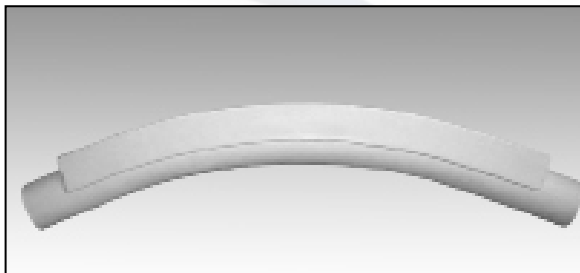
The Replaceable-Back Elbow is constructed from a pipe or tube elbow. The sides are made from 10GA material welded to the bend. The back of the elbow is also 10GA material, but 10GA AR plate and 1/4" steel is also available. The back plate can be replaced as needed. Extra back plates are available at the time of purchase. Available in both Carbon Steel and Stainless Steel construction.

This elbow is an excellent choice for lower abrasion applications.

It is not recommended for food applications, due to the open voids that can collect material.

Available in plain ends, flanged ends, grooved ends, or other specified ends. Special orders are welcome.

## Mortar-Filled (Cement Back) Elbow



Cross Section of Elbow

This elbow has a cavity back filled with hard concrete. The metal exterior can be constructed out of various thicknesses of materials. A standard or custom mix concrete can be used. For high heat applications, refractory can be used instead of cement.

This elbow is available in every size, degree, and bendable centerline radius.

These can be constructed from both Carbon Steel and Stainless Steel.

Typical applications include Abrasive Dust, Coal Fines, Fly Ash & Portland Cement

Available in plain ends, flanged ends, grooved ends, or other specified ends. Special orders are welcome.

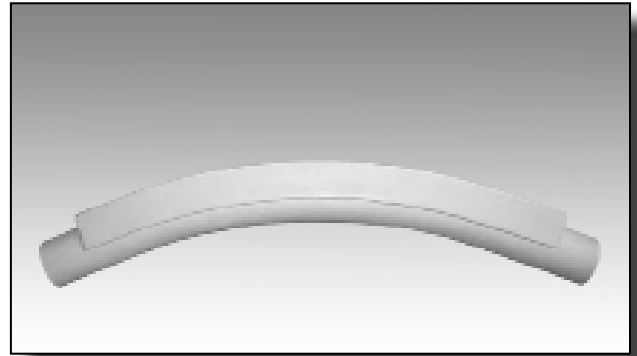


## Hollow-Back Elbow

Our Hollow-Back elbow is designed to capture abrasive product in the fabricated back cavity. The abrasive material then rides against itself. We fabricate the Hollow-Back by using a tube or pipe elbow, thus eliminating the need for transitions. Typical construction is 10Ga material. Thicker metal and AR plate is available.

Available in both Carbon Steel and Stainless Steel construction.

This elbow is an excellent choice for higher abrasion applications with material that packs. It is not recommended for food applications, due to the open voids that can collect material. Typical Applications include Sand and Powdered Coal.



Available in plain ends, flanged ends, grooved ends, or other specified ends. Special orders are welcome.

## Porcelain Lined Elbows and Tubing

Porcelain lining is used due to its resistance to corrosive attack, atmospheric pollution, extreme weather conditions, and abrasion. In these extreme environments, standard steel tube, pipe, and elbows can have a limited service life.

Porcelain enamel is a glassy compound that is adhered to the inside diameter of tube or pipe. This compound is applied as a liquid slurry to the interior of carbon or stainless steel. When baked, the result is a glassy interior surface that is rated at 6 to 7 on the Moh's scale of hardness; diamonds are the hardest at a rating of 10. The surface will easily resist scratching from a steel blade.

Porcelain lining is available in single or double coat, and the thickness of the coating is checked before shipment. Single coating is .004-.007" thick, and double coating is .008-.012" thick. Tube or pipe up to 10' in length can be porcelain lined.



ChaDa Sales has an answer for all of your difficult applications. Please give us a call to discuss!



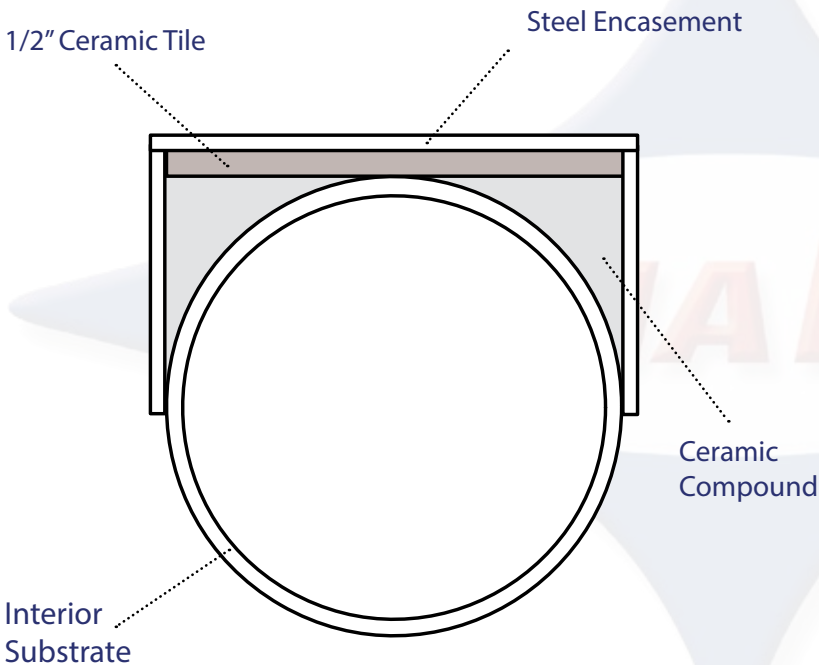
# Ceramic Flat-Back Elbows

Designed and manufactured for extremely abrasive applications. The key to our Cast Ceramic "Flat-Back" elbow is that it uses a pipe or tube for the inner core substrate. Using a pipe or tube core lessens the wear caused by the outlet transition, which is no longer needed (going from square back to round).



\*Flat-Back without cover showing cast tiles

## Cross-Section of Flat-Back® Elbow



- Highly Abrasion Resistant
- Impact Resistant
- Easily replaces existing elbows
- Does not change line flow
- Available in any degree & CLR
- Available in CS and SS
- Available in Pipe or Tube

Available in plain ends, flanged ends, grooved ends, or other specified ends. Special orders are welcome.



\*after completion showing flow direction



# Ceramic Fittings

## Ceramic Coating

ChaDa Sales has the ability to coat whatever parts you may need. This includes laterals, TY's, wyes, bifurcated bends, cyclones, tube adapters, blow-thru adapters, diverter valve transitions, wear plates, or your specific part. Plain ends, flanges, threaded, and custom ends are available.



## Ceramic Lining

We can ceramic coat - or tile line - the inside of cyclones, chutes, bins, target boxes, and certain types of valves.



## Ceramic Coated Dead End Tee

This specialty Tee acts like a short radius elbow. The material fills up the closed end then protects itself from abrasion using the application material. This elbow is ceramic coated for extra protection and is extremely effective against severe abrasion.

