

# Ceramic-Lined Elbows

*Ceresist ceramic-lined elbows are designed to outlast linings such as glass, rubber, basalt, hardfacings, and coatings, that are commonly used to extend the life of piping systems. All elbows feature extremely wear resistant ceramics that are also exceptionally corrosion-resistant.*



## 22.5° up to 180° Bends

Ceresist provides elbows that conform to ASME B16.5 as standard, or can fabricate virtually any custom bend with angles ranging from a few degrees up to 180° or greater, and with centerline radii up to 60" or greater.

## Technical Ceramics

Ceresist elbows are available with high-purity alumina, nitride-bonded silicon carbide, or sintered silicon carbide ceramics. These ceramics are extremely corrosion and wear resistant materials, and their preference is based upon the severity of the process.

## Solid Ceramic Lining

Nitride-bonded silicon carbide linings are cast as one-piece, whereas the alumina and sintered silicon carbide ceramics are fitted sections. Using the same sealing technology as is found in ceramic valves, we are able to ensure zero leakage between the individual segments, and therefore even segmented elbows perform as well as single-piece linings.

## Heavy-Wall Ceramic

All reducers feature very heavy wall thickness ceramics that allows their use in the most severely erosive services. The standard wall thickness for most reducers is ½", which is more than 50 times the thickness of thermally-sprayed wear-resistant coatings.

## Exterior Protection

Carbon steel fittings are sandblasted, degreased, and coated with a corrosion and abrasion resistant finish for added protection and longevity in harsh environments. Bare or coated stainless steel and other alloys are offered as well.

## Minimal Transition

The ceramic OD and flange ID are tightly toleranced to minimize gaps and to keep epoxy exposure to an absolute minimum.

## Perfect Matching

Our innovative manufacturing methods ensure a smooth, perfectly matched and level sealing surface without any length difference between the flange face and the ceramic lining, assuring zero leak-by.

## ASME Conformance

All flanged fittings meet or exceed ASME B16.5 requirements for pressure-temperature ratings, materials, dimensions, tolerances, marking, and testing.

## Applications and Variations

**The use of Ceresist ceramic-lined elbows is ideal in services that are prone to rapid erosive wear, and where standard piping would fail within 24 months or less.**

### Ceramic Material Comparison

Nitride-bonded silicon carbide consists of sintered silicon carbide particles fired in a silicon nitride ceramic matrix. It is nine times harder than carbon or stainless steel, exhibits superior chemical resistance to acids and alkalis, and furthermore possesses excellent high temperature and thermal shock resistance. It is a castable ceramic and therefore continuous, one-piece ceramic linings may be fabricated. This material is the ceramic of choice for basic wear applications.

High-purity 99.5% and 99.8% alumina ceramics are 42% harder than chrome carbide hardfacing, three times harder than glass, and nine times harder than carbon or stainless steel. Alumina also exhibits an extremely high level of corrosion resistance — even at high temperatures — and is the ideal material for high wear applications where corrosive and abrasive fluids are present. It is a very cost-effective material, and its use is recommended in services that are highly aggressive.

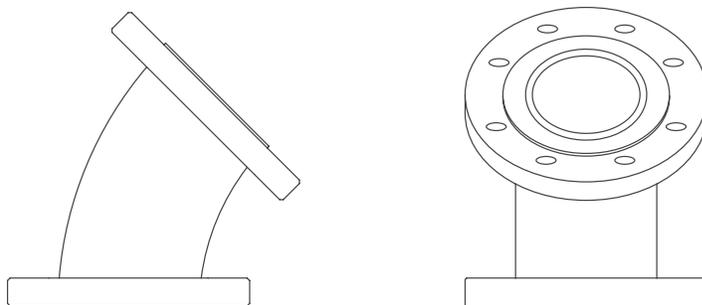
Sintered silicon carbide the most wear- and corrosion-resistant ceramic we offer for use in exceptionally aggressive services. It is 16.5x harder than carbon steel, and its use is highly recommended for services that contain:

- Pneumatically-conveyed ores or powders
- Media at a high velocity and/or high differential pressure
- Highly corrosive fluids as well as erosive particles

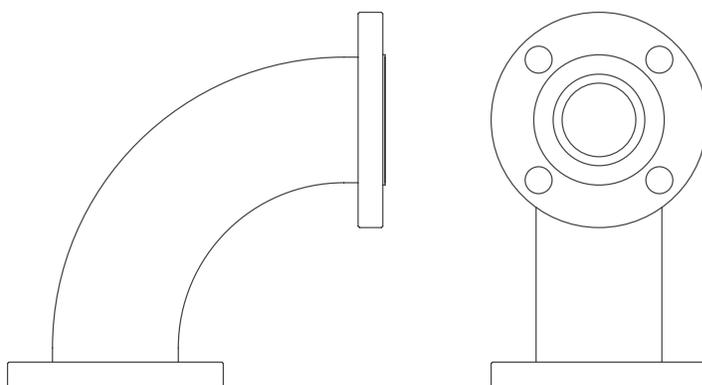
Additionally, if standard elbows are failing within nine months or less, the installation of sintered silicon carbide elbows is highly recommended.

### Housing Materials

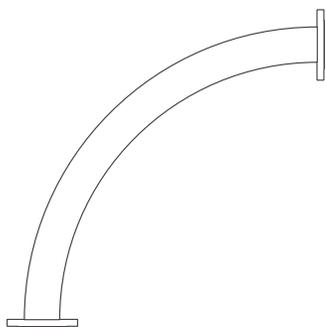
In addition to our standard carbon steel housing, stainless steel 316, 304, and other alloy or plastic housing materials may be supplied. For added protection, a corrosion and abrasion-resistant epoxy coating may be applied to offer further longevity in harsh environments.



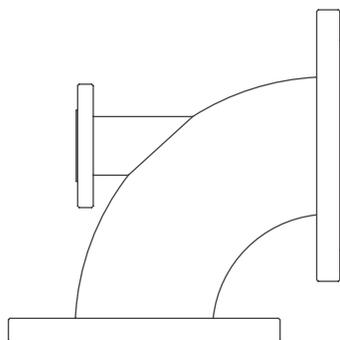
Standard 45° Short-Radius Elbow



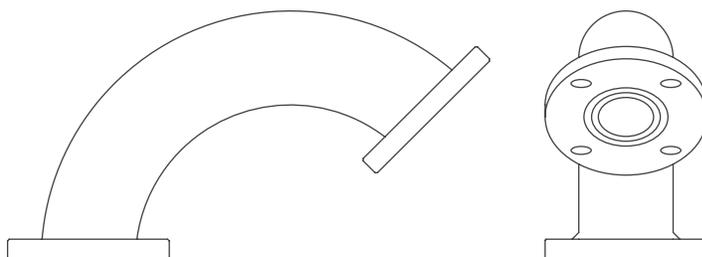
Standard 90° Long-Radius Elbow



90° Custom Long-Radius Elbow



90° Long-Radius Elbow with Auxiliary Connection



135° Custom-Radius Elbow

# Ceresist

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