

ChaDa Sales proudly represents:



HAMMERTEK[®]



Industries that benefit from Impact-Free, Heat-Free Pneumatic Conveying with SMART ELBOW[®] Deflection Elbows:

- Plastics
- Concrete
- Food
- Mining
- Pulp & Paper
- Power
- Wastewater
- Chemical

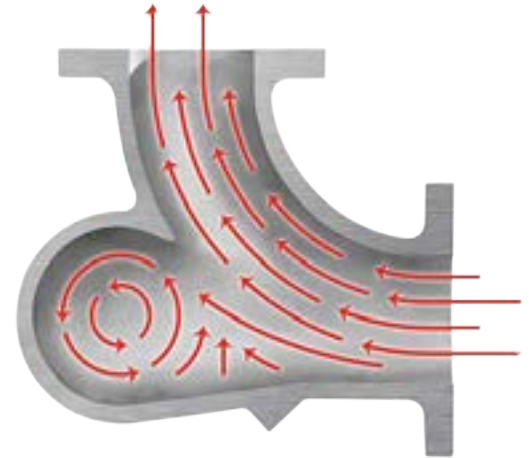
SMART ELBOW[®] Deflection Elbows Prevent Material from Impacting the Elbow Wall, Preventing Abrasive Elbow Wear and Material Breakage, Fines, Melting, Plugging and Build-Up.

Available in cast iron, carbon steel, aluminum, stainless steel and special alloys in 90 and 45 degrees with flanged and socket-weld ends.



Smart Elbow® By HammerTek

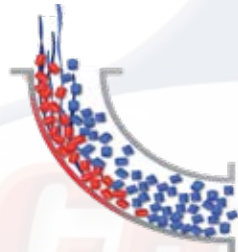
Unlike conventional "impact" elbows and "plugged-tee" elbows that rely on material impact to change direction HammerTek's Smart Elbow® design employs a spherical chamber that protrudes partially beyond the desired 90° or 45° pathway, causing a ball of material suspended in air to rotate. Since the ball of material rotates in the same direction as the airstream that powers it, incoming material is cushioned by the ball's rotation, and is gently deflected around the bend. By preventing impact with the elbow wall, HammerTek's Smart Elbow® deflection elbow virtually eliminates costly elbow wear, material degradation, melting and plugging.



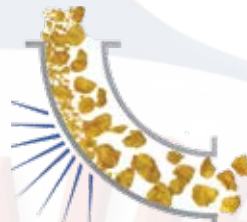
Which of the top 4 elbow problems do you need to solve?



Problem: Wear and failure when conveying abrasives such as sand, glass, alumina or mineral filled plastic pellets incur never-ending costs of replacement elbows, labor and downtime.
Cause: Abrasives hit the outside radius of conventional impact elbows at high speed, continually wearing through the elbow wall.



Problem: Formation of streamers, angel hair and snake skins when conveying pelletized resins and compounds causes downstream quality problems.
Cause: Pellets skidding against the outside radius of conventional elbows create friction and heat, melting pellet surfaces, forming streamers.



Problem: Breakage and dusting of fragile materials such as pet food, coffee beans or grains, decrease product quality, consistency and salability while increasing waste.
Cause: Friable materials hit the outside radius of conventional impact elbows at high speed, degrading the material and generating fines.



Problem: Plugging and build-up when conveying sugar, rubber pellets, hot melt adhesives, clay and other pressure and heat-sensitive materials prone to build-up.
Cause: Materials skidding against the outside radius of conventional elbows create friction and heat, causing product build-up.

SOLUTION:

Smart Elbow® Deflection Elbow from HammerTek® ends problems by eliminating impact and frictional heat.



Smart Elbow Alloy Characteristics

Aluminum (CI)	90-100 BHN	
<p>Available in pipe schedule 10/40 sizes and tube sizes with socket weld or flange end configurations. Lightweight and strong with good wearing properties as compared to the low tensile.</p> <p>Example of products conveyed: PVC pellets, plastic, resins, nylon and plastic pellets, flour, sugar, tea, etc. Qualify dry foods.</p>		
Cast Iron (CI)	174-228 BHN	Max Temp 600°F
<p>Available in pipe schedule 10/40 and schedule 80 sizes and tube sizes with flanged end configurations only. Strong and low cost. Used for medium abrasive type materials up to approximately 5 on the Mohs scale.</p> <p>Example of products conveyed: Bituminous coal-50 mesh, shelled corn, grain, charcoal, hog fuel, alfalfa seeds, malt (dry ground), oats, wood chips, epoxy powders, condensate, soybeans, etc.</p>		
Hammerlast™ Series 400 (H4)	380-420 BHN	Max Temp 600°F
<p>Available in pipe schedule 10/40 and schedule 80 sizes and tube sizes with flanged end configurations only. Conveys materials up to 5.5/6.0 on the Mohs scale. This alloy also has excellent wear resistant properties.</p> <p>Example of products conveyed: Bottom ash, sand, lime, pulverized coal, diatomaceous earth, feldspar-1/2", flue dust, crushed limestone, mica, oyster shells, fly ash, slate dust, core sand, bank sand, trap rock-1/2", pebble lime, bank run gravel, copper, crushed ore, hard brick, wet cement, bauxite, etc.</p>		
Hammerloy™ (HL)	500-555 BHN	Max temp: *see below
<p>Available in pipe schedule 10/40 and schedule 80 sizes and tube sizes with flanged end configurations only. Conveys materials up to 8.0/9.0 on the Mohs scale. This alloy is used for extremely heavy situations and/or replaces HammerLast Series 400 when light material loading and high velocity exists. Has also replaced ceramic lined carbon steel in fly ash situations.</p> <p>*Maximum working temperature is as follows: Constant 200-250°F; Intermittent 400°F</p> <p>Example of products conveyed: Fly ash, silica sand, zirconia, coke breeze, alumina, emery, etc.</p>		



Characteristics continued...

Hard Ductile Iron (DH)	240-300 BHN	Max Temp: 500°F
<p>Available in tube sizes with socket-weld end configurations only. Hard Ductile Iron is a reliable substitute for aluminum and not as brittle as cast iron. Allows line flex (elongation=3%) and is more wear resistant than regular ductile iron, aluminum, cast iron, or carbon steel.</p> <p>Example of products conveyed: Similar to products conveyed by aluminum, stainless steel, carbon steel, and cast iron. Can be used to convey glass-filled plastic pellets. Used when tube size is specified.</p>		

Carbon Steel (SC)	175-190 BHN	Max Temp 800°F
<p>Available in pipe schedule 10/40 sizes and tube sizes with socket-weld and flange end configurations. Call for availability of pipe schedule 80 sizes. Used in industries as absolute specified alloy. Operates well with temperature differential. Often, carbon steel is inappropriately specified when other, more economical alloys will out-perform it. Elongation: 24%.</p> <p>Example of products conveyed: Used as a specified alloy in the petroleum and mining industries due to its capability to withstand sudden changes from hot to cold</p>		

Stainless Steel 304 (S4)	130-150 BHN	Max Temp 1100-1400°F
Stainless Steel 316 (S6)	130-150 BHN	Max Temp 1100-1400°F
<p>Available in pipe schedule 10/40 sizes and tube sizes with socket-weld and flange end configurations. Call for availability of pipe schedule 80 sizes. Uses for smooth bore operations and clean industries. Will accept high heat factors. Aluminum may be a substitute when stainless steel is indiscriminately specified. Type 316 is more resistant to harsh chemicals and has a larger amount of chromium and nickel than type 304.</p> <p>Examples of products conveyed: Plastics, plastic pellets, pharmaceuticals, clean products, finished food products, products with chemical properties that are corrosive to other standard alloys, etc.</p> <p>Composition: Carbon, Manganese, Silicon, Phosphorus, Sulphur, Chromium, Nickel, Molybdenum</p>		

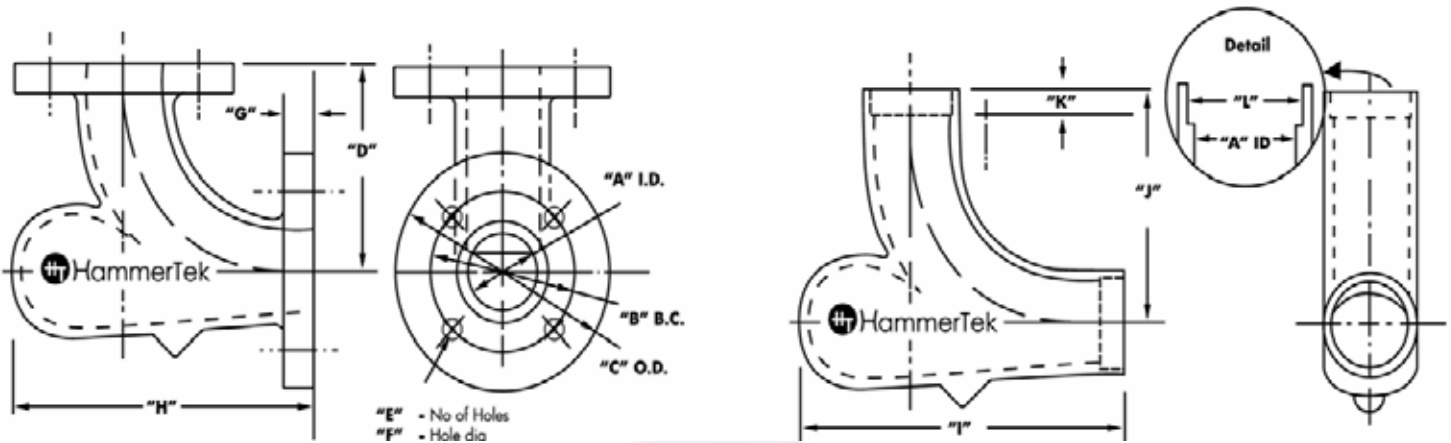
Special Notes:

- Brinell Hardness (BHN) numbers are usually a varied range.
- The Brinell Hardness and Mohs scale are guidelines for basic conveying operations only. EXAMPLE: Fly ash is approximately 7.0 on the Mohs scale. Under normal circumstances, we would recommend Hammerlast Series 400; however, suppose that the system is extremely light loaded with high velocity. Then the alloy recommended would be Hammerloy.



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Smart Elbow® deflection elbow - 90° 11 Gauge Tube Dimensions

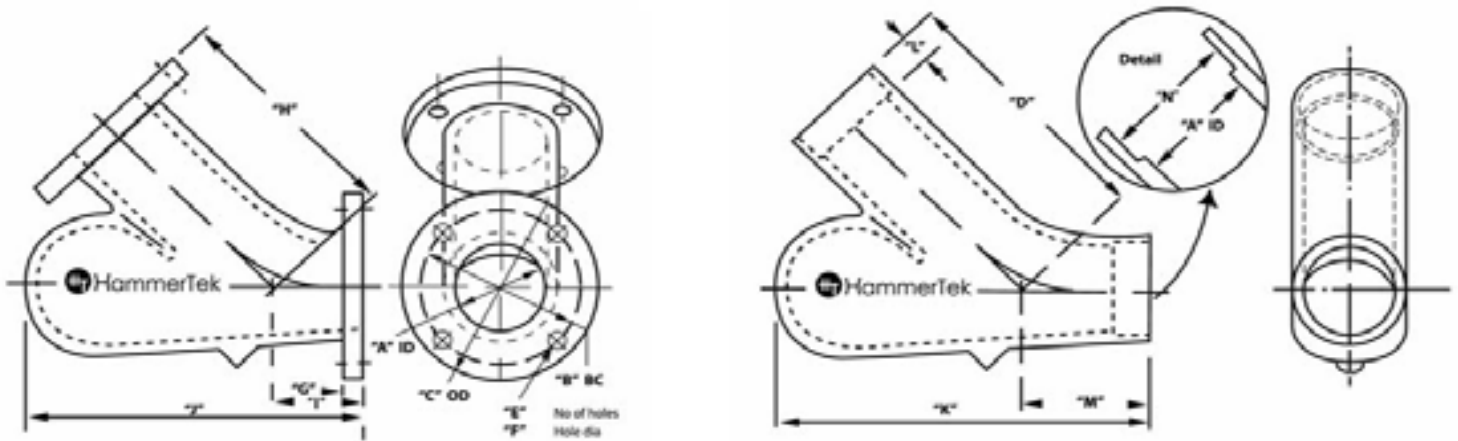


Tube Size	1.5"	1.75"	2"	2.25"	2.5"	3"	3.5"	4"	4.5"	5"	6"	8"
A	1.25	1.5	1.75	2.00	2.25	2.75	3.26	3.75	4.25	4.75	5.75	7.75
B	N/A	N/A	4.75	N/A	5.50	6.00	6.00	7.00	7.50	8.50	9.50	11.75
C	N/A	N/A	6.00	N/A	7.00	7.50	7.50	8.50	9.00	10.00	11.00	13.50
D	N/A	N/A	7.00	N/A	7.00	7.75	7.50	8.50	8.94	10.25	11.50	14.25
E	N/A	N/A	4.00	N/A	4.00	4.00	4.00	8.00	8.00	8.00	8.00	8.00
F	N/A	N/A	0.75	N/A	0.75	0.75	0.75	0.75	0.75	0.88	0.88	0.88
G	N/A	N/A	0.63	N/A	0.69	0.75	0.75	0.94	1.00	0.94	1.00	1.13
H	N/A	N/A	9.00	N/A	10.13	11.13	12.25	13.91	14.88	18.06	21.13	27.63
I	9.50	9.50	11.00	11.68	12.13	13.13	15.13	18.22	18.00	22.88	26.63	33.63
J	7.50	7.50	8.50	8.06	9.00	9.75	10.50	12.81	12.06	15.06	17.00	20.25
K	2.50	2.50	2.63	2.63	2.69	2.75	3.00	4.00	4.25	4.50	5.50	7.00
L	1.50	1.75	2.00	2.25	2.50	3.00	3.50	4.00	4.50	5.00	6.00	8.00

Chamfering available to match 14, 16 or 18 gauge tubing



Smart Elbow® deflection elbow - 45° 11 Gauge Tube Dimensions



Tube Size	2"	2.5"	3"	3.5"	4"	4.5"	5"	6"	8"
A	1.75	2.25	2.75	3.25	3.75	4.25	4.75	5.75	7.75
B	4.75	5.50	6.00	6.00	7.00	7.5	8.50	9.50	11.75
C	6.00	7.00	7.50	7.50	8.50	9.00	10.00	11.00	13.50
D	9.44	10.13	11.38	12.50	15.69	16.38	18.81	22.25	26.00
E	4.00	4.00	4.00	4.00	8.00	8.00	8.00	8.00	8.00
F	0.75	0.75	0.75	0.75	0.75	0.75	0.88	0.88	0.88
G	0.63	0.69	0.75	0.75	0.94	1.00	0.94	1.00	1.13
H	7.44	8.13	9.38	8.56	11.38	13.25	14.00	16.75	20.00
I	3.06	3.25	3.63	4.06	3.88	4.75	4.81	5.31	7.00
J	9.00	10.13	11.19	12.62	13.91	15.88	18.50	21.50	28.38
K	2.63	2.69	2.75	3.00	4.00	4.25	4.50	5.50	7.00
L	2.00	2.50	3.00	3.50	4.00	4.50	5.00	6.00	8.00
M	5.06	5.25	5.63	7.00	8.19	7.88	9.63	10.81	14.00
N	2.00	2.50	3.00	3.50	4.00	4.50	5.00	6.00	8.00

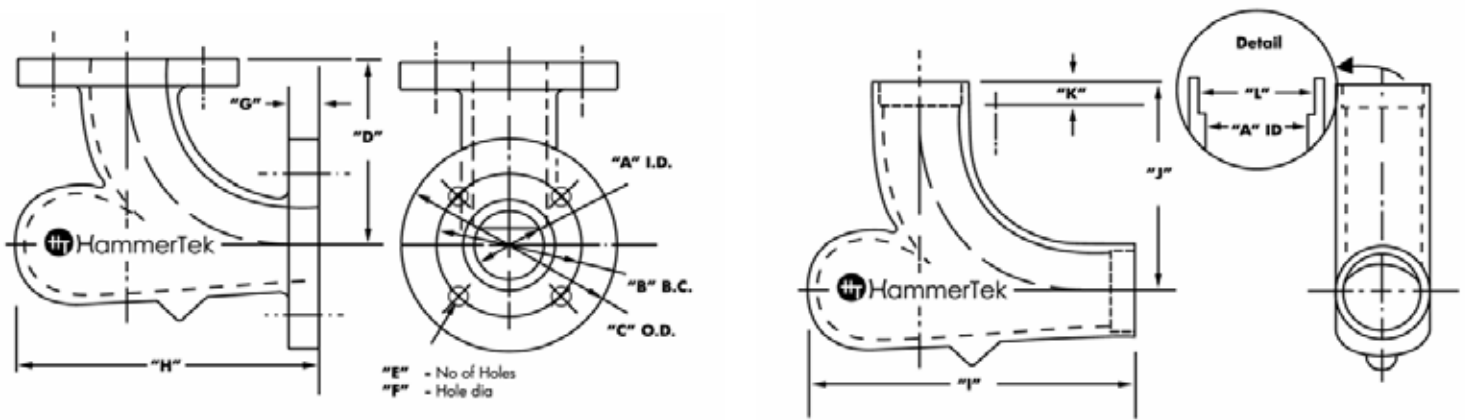
Chamfering available to match 14, 16 or 18 gauge tubing





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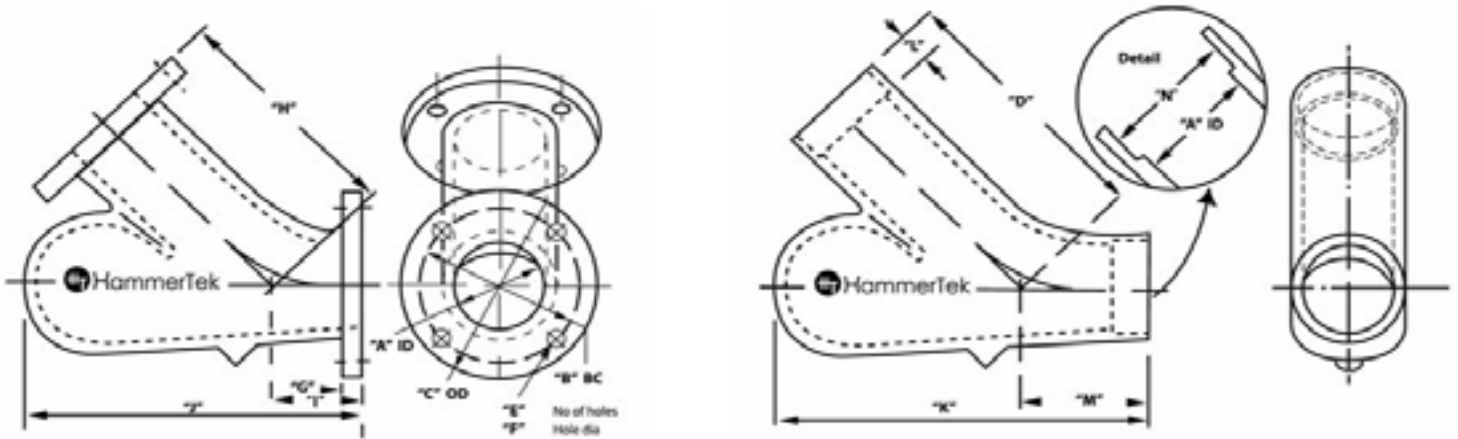
Smart Elbow® deflection elbow - 90° Schedule 10/40 Pipe Dimensions



Pipe Size	1.25"	1.5"	2"	2.5"	3"	3.5"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"
A	1.38	1.68	2.19	2.64	3.25	3.75	4.25	5.361	5.34	8.31	10.38	12.38	13.50	15.50	17.50	19.50
B	3.50	3.88	4.75	5.50	6.00	7.00	7.50	8.50	9.50	11.75	14.25	17.00	18.75	21.25	22.75	25.00
C	4.62	5.00	6.00	7.00	7.50	8.50	9.00	10.00	11.00	13.50	16.00	19.00	21.00	23.50	25.00	27.50
D	5.43	5.00	6.06	7.00	7.50	8.50	8.94	10.25	11.50	14.13	16.50	19.00	21.50	23.81	25.50	55.69
E	4.00	4.00	4.00	4.00	8.00	8.00	8.00	8.00	8.00	8.00	12.00	12.00	12.00	16.00	16.00	20.00
F	0.63	0.63	0.75	0.75	0.75	0.75	0.75	0.88	0.88	0.88	1.00	1.00	1.13	1.13	1.25	1.25
G	0.63	0.68	0.75	0.88	0.94	0.94	1.00	1.00	1.00	1.13	1.25	1.25	1.38	1.50	1.62	1.69
H	7.32	7.75	9.50	10.44	12.31	13.94	14.88	18.50	21.25	26.75	31.81	39.75	45.38	51.43	54.25	75.00
I	8.62	9.06	10.75	11.94	13.62	15.75	16.63	20.25	23.50	29.25	34.81	43.25	49.38	55.93	59.00	N/A
J	6.75	6.25	7.31	8.31	8.81	10.31	10.69	12.00	13.75	16.63	19.50	22.50	25.50	28.31	30.25	N/A
K	1.88	1.94	2.00	2.18	2.25	2.75	2.75	2.75	3.25	3.63	4.25	4.75	5.38	6.00	6.50	N/A
L	1.66	1.91	2.38	2.88	3.50	4.00	4.50	5.56	6.63	8.63	10.75	12.75	14.00	16.00	18.00	N/A



Smart Elbow® deflection elbow - 45° Schedule 10/40 Dimensions



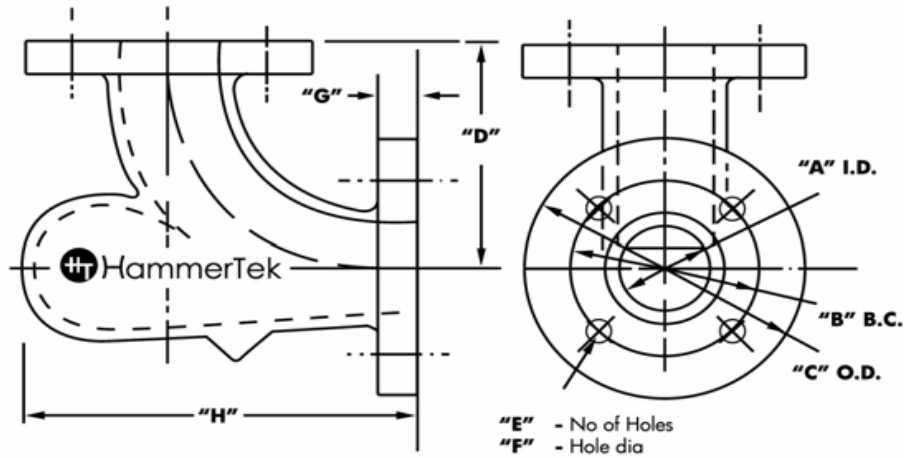
Pipe Size	1.5"	2"	2.5"	3"	3.5"	4"	5"	6"	8"	10"	12"	14"	16"
A	1.68	2.19	2.64	3.25	3.75	4.25	5.31	5.34	8.31	10.38	12.38	13.50	15.50
B	3.88	4.75	5.50	6.00	7.00	7.50	8.50	9.50	11.75	14.25	17.00	18.75	21.25
C	5.00	6.00	7.00	7.50	8.50	9.00	10.00	11.00	13.50	16.00	19.00	21.00	23.50
D	7.31	9.00	9.56	10.75	13.18	14.56	15.50	19.06	23.75	28.00	32.63	37.75	43.75
E	4.00	4.00	4.00	4.00	8.00	8.00	8.00	8.00	8.00	12.00	12.00	12.00	16.00
F	0.63	0.75	0.75	0.75	0.75	0.75	0.88	0.88	0.88	1.00	1.00	1.13	1.13
G	0.68	0.75	0.88	0.94	0.94	1.00	1.00	1.00	1.13	1.25	1.25	1.38	1.50
H	6.06	7.75	8.13	9.44	11.38	12.81	13.75	16.81	21.25	25.00	29.13	33.75	39.25
I	2.56	3.38	3.31	4.00	3.88	4.68	5.25	5.75	6.50	8.03	9.13	9.81	10.75
J	7.75	9.38	10.44	12.56	13.94	15.88	19.25	21.00	28.75	35.44	41.43	46.81	53.06
K	8.81	10.62	11.94	13.87	15.75	17.63	21.00	23.25	31.25	38.44	44.93	50.81	57.56
L	1.94	2.00	2.18	2.25	2.75	2.75	2.75	3.25	3.63	4.25	4.74	5.38	6.00
M	3.81	4.63	4.62	5.31	5.69	6.56	7.00	8.00	9.00	11.03	12.63	13.81	15.25
N	1.91	2.38	2.88	3.50	4.00	4.50	5.56	6.63	8.63	10.75	12.75	14.00	16.00





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Smart Elbow® deflection elbow - 90° Schedule 80 Pipe Dimensions

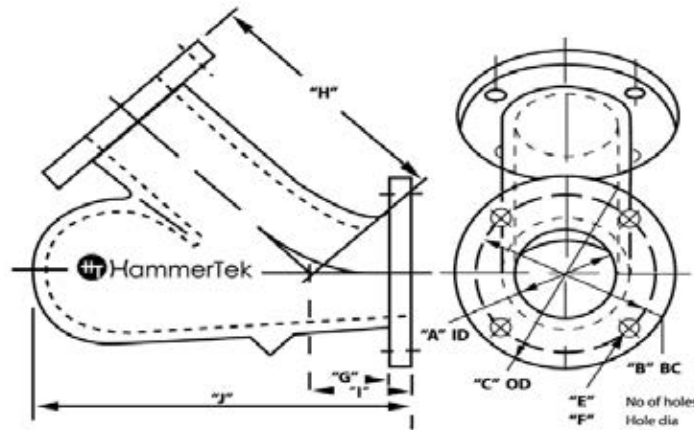


Pipe Size	1"	1.25"	1.5"	2"	2.5"	3"	3.5"	4"	5"	6"	8"	10"	12"	14"
A (All)	0.94	1.28	1.50	1.94	2.32	2.90	3.36	3.83	4.81	5.76	7.63	9.56	11.37	12.50
B 150# FL	3.12	3.50	3.88	4.75	5.50	6.00	7.00	7.50	8.50	9.50	11.75	14.25	17.00	18.75
B 300# FL	3.50	3.88	4.50	5.00	5.88	6.63	7.25	7.88	9.25	10.63	13.00	15.25	17.75	20.25
C 150# FL	4.50	4.62	5.00	6.00	7.00	7.50	8.50	9.00	10.00	11.00	13.50	16.00	19.00	21.00
C 300# FL	4.88	5.25	6.13	6.50	7.50	8.25	9.00	10.00	11.00	12.50	15.00	17.50	20.50	23.00
D* (All)	5.12	5.56	5.13	6.19	7.00	7.63	8.63	9.06	10.38	11.63	14.25	16.62	19.12	21.62
E 150# FL	4.00	4.00	4.00	4.00	4.00	4.00	8.00	8.00	8.00	8.00	8.00	12.00	12.00	12.00
E 300# FL	4.00	4.00	4.00	8.00	8.00	8.00	8.00	8.00	8.00	12.00	12.00	16.00	16.00	20.00
F 150# FL	0.62	0.62	0.63	0.75	0.75	0.75	0.75	0.75	0.88	0.88	0.88	1.00	1.00	1.25
F 300# FL	0.75	0.75	0.88	0.75	0.88	0.88	0.88	0.88	0.88	0.88	1.00	1.12	1.25	1.25
G 150# FL	0.68	0.75	0.82	0.88	1.00	1.06	1.06	1.13	1.13	1.13	1.25	1.38	1.38	1.50
G 300# FL	0.75	0.82	0.82	0.88	1.00	1.13	1.19	1.25	1.38	1.44	1.63	2.00	2.12	2.25
H* (All)	6.38	7.50	7.88	9.63	10.56	12.43	14.06	15.00	18.63	21.33	26.88	31.94	39.88	45.62
Raised Face Dia. (All)	2.00	2.5	2.88	3.63	4.13	5.00	5.50	6.19	7.31	8.50	10.63	12.75	15.00	16.25

* Add 1/16" for 150# and 300# raised-face.



Smart Elbow® deflection elbow - 45° Schedule 80 Pipe Dimensions



Pipe Size	1.5"	2"	2.5"	3"	3.5"	4"	5"	6"	8"
A (All)	1.50	1.94	2.32	2.90	3.36	3.83	4.81	5.76	7.63
B 150# FL	3.88	4.75	5.50	6.00	7.00	7.50	8.50	9.50	11.75
B 300# FL	4.50	5.00	5.88	6.63	7.25	7.88	9.25	10.63	13.00
C 150# FL	5.00	6.00	7.00	7.50	8.50	9.00	10.00	11.00	13.50
C 300# FL	6.13	6.50	7.50	8.25	9.00	10.00	11.00	12.50	15.00
E 150# FL	4.00	4.00	4.00	4.00	8.00	8.00	8.00	8.00	8.00
E 300# FL	4.00	8.00	8.00	8.00	8.00	8.00	8.00	12.00	12.00
F 150# FL	0.63	0.75	0.75	0.75	0.75	0.75	0.88	0.88	0.88
F 300# FL	0.88	0.75	0.88	0.88	0.88	0.88	0.88	0.88	1.00
G 150# FL	0.82	0.88	1.00	1.06	1.06	1.13	1.13	1.13	1.25
G 300# FL	0.82	0.88	1.00	1.25	1.19	1.25	1.38	1.44	1.63
H* (All)	6.19	7.88	8.25	9.56	11.50	12.94	13.88	16.94	21.38
i* (All)	2.69	3.50	3.43	4.13	4.00	4.81	5.38	5.88	6.63
J* (All)	7.88	9.50	10.56	12.69	14.06	16.00	19.38	21.13	28.88
Raised Face Dia. (All)	2.88	3.63	4.13	5.00	5.50	6.19	7.31	8.50	10.63

* Add 1/16" for 150# and 300# raised-face.





800-255-6213

Application Data for HammerTek Smart Elbows
Pneumatic Conveying - Dry Materials



Please fill out and return to ChaDa Sales
Email: chada@chadasales.com

Company Name: Date:
Address: City: State: Country:
Contact Name: Title:
Phone: Ext: Fax: E-mail:

SYSTEM INFORMATION:

Material: If plastics: Glass-filled % Mineral-filled %
Operating Temp: EF Lbs./cu.ft.: Particle Size: Moisture: %
Hygroscopic? Other Characteristics:
Is this a truck unload system? Distance from pick-up to first elbow: ft.

DILUTE PHASE Pressure or Vacuum (Circle One) Production Rate TPH # / min.
Operating Pressure: PSIG (Pressure Sys.) Hg (Vacuum)
Air Volume: SCFM ACFM
Velocities: FPM (Pick up / acceleration) FPM (Terminal)
Method of feed (RV, eductor, screw, wild flow, etc.):

DENSE PHASE Operating Pressure: PSIG Size of Pressure Vessel: cu. ft.
Cycle Time: Min. On Min. Off Is air flow continuous? Yes No
Does System Have Line Air Boosters? Yes No Is the System a Plug Flow/Pulse Flow

CONVEYING LINE INFORMATION

Pipe Alloy: Pipe Size: Schedule:
Tube Size OD: Gauge: Elbow Alloy:
If retrofit, type and alloy currently used:
Longevity of current elbow: Other Comments:
of elbows in the system: 90E 45E Other degree elbows: # Diverter Valves:
vertical runs: # horizontal runs: (45E Smart Elbows not recommended in vertical plane)
Total line length: ft. Vertical length: ft. Horizontal Length: ft.
Type of elbow connection: Flange Socket-weld No-Weld Special Compression Couplings (Circle One)

Free Trial*: Yes No
One-Year One-Time Free Replacement Warranty*: Yes No



Application Data for HammerTek Smart Elbows
Slurry Conveying / Transfer Systems

Please fill out and return to ChaDa Sales
Email: chada@chadasales.com

Company Name: _____ Date: _____
Address: _____ City: _____ State: _____ Country: _____
Contact Name: _____ Title: _____
Phone: _____ Ext: _____ Fax: _____ E-mail: _____

SLURRY SYSTEMS:

Liquid: _____ Type Solids: _____ % Solids by Weight _____ %
Particle Size of Solids: _____ Other Chemicals in Slurry: _____
Specific Gravity of Solids: _____ Flow Rate: _____ GPM Velocity: _____ FPS
Operating Pressure: _____ PSIG Slurry Temp: _____ EF

Other characteristics on the existing system (such as choking, hammer effect, wear) and any special notes that may be applicable: _____

LIQUID/CONDENSATE

Type: Liquid Condensate (Circle One) Flow Rate: _____ GPM #/Min
Velocity: _____ FPS Temperature: _____ EF Operating Pressure: _____ PSIG
Other comments pertinent to the system: _____

STEAM SERVICE

Operating Pressure: _____ PSIG Flow Rate: _____ #/Min
Temperature: _____ EF Velocity: _____ FPS
Other comments pertinent to the system: _____

PIPING INFORMATION

Pipe Alloy: _____ Pipe Size: _____ Schedule: _____ Elbow Alloy: _____
Longevity of current alloy: _____ Other Comments: _____
of elbows in the system: _____ 90E _____ 45E Other degree elbows: _____
Total line length: _____ ft. Vertical length: _____ ft. Horizontal Length: _____ ft.
Type of ANSI flange: 125# 150# 300# Other: _____

Free Trial*: Yes No
One-Year One-Time Free Replacement Warranty*: Yes No