

# ARMSTRONG NANOBUBBLE GENERATOR

## SYSTEM SOLUTION FOR SCALE REMOVAL AND INHIBITION

The Nanobubble Generator is a proven solution for the inhibition and removal of scale in hot water systems. This patented technology is easily installed, has no moving parts, requires no maintenance or additional electrical inputs, and uses no chemicals.

Whether it's on a heat exchanger or strategically placed within the hot water piping infrastructure to address the entire system, the Nanobubble Generator significantly reduces scale, which improves the overall health of the hot water system and drives operational efficiencies, leading to a smaller carbon footprint.



Armstrong Nanobubble Generator Model ANG25



Armstrong Nanobubble Generator Model ANG80

Designs, materials, weights, and performance ratings are approximate and subject to change without notice. Visit [armstronginternational.com](http://armstronginternational.com) for the most up-to-date information.



# ARMSTRONG NANOBUBBLE GENERATOR

## OPERATING RANGES

Armstrong Nanobubble Generator - Recommended Operating Ranges													
3/4" x 1-1/2"		1" x 2"		1-1/2" x 2-1/2"		2" x 3"		3" x 4"		4" x 6"		6" x 8"	
ANG20		ANG25		ANG40		ANG50		ANG80		ANG100		ANG150	
GPM	Pressure Drop (psi)	GPM	Pressure Drop (psi)	GPM	Pressure Drop (psi)	GPM	Pressure Drop (psi)	GPM	Pressure Drop (psi)	GPM	Pressure Drop (psi)	GPM	Pressure Drop (psi)
1.1	2.5	6.7	2.5	20.9	2.7	43.0	3.5	60.0	3.0	150.0	2.8	350.0	3.2
1.4	3.1	8.3	3.1	26.5	3.4	46.0	3.9	70.0	3.4	175.0	3.3	400.0	3.7
1.7	3.8	10	3.8	32.1	4.1	50.0	4.4	80.0	3.9	200.0	3.8	450.0	4.2
1.9	4.4	11.7	4.4	35	4.5	53.0	4.6	90.0	4.4	225.0	4.2	500.0	4.6
2.2	5.0	13.3	5	37.8	5	56.0	4.8	100.0	4.9	250.0	4.7	550.0	5.1
2.5	5.6	15	5.6	39.3	5.3	60.0	5.0	110.0	5.4	275.0	5.2	600.0	5.5
2.8	6.3	16.7	6.3	40.6	5.7	63.0	5.3	120.0	5.9	300.0	5.6	650.0	6.0
3.1	6.9	17.5	6.6	42	6	66.0	5.8	130.0	6.4	325.0	6.1	700.0	6.5
3.3	7.5	18.3	6.9	43.5	6.4	70.0	6.3	140.0	6.9	350.0	6.6	750.0	6.9
3.6	8.1	20	7.5	44.9	6.8	73.0	6.5	150.0	7.4	375.0	7.0	800.0	7.4
3.7	8.4	21.7	8.1	46.3	7.1	76.0	7.0	160.0	7.9	400.0	7.5	850.0	7.8
3.9	8.8	22.5	8.4	47.7	7.5	80.0	7.5	170.0	8.4	425.0	8.0	900.0	8.3
4.0	9.0	23.3	8.8	49.1	8.1	83.0	7.7	180.0	8.9	450.0	8.4	950.0	8.8
4.2	9.4	25	9.4	52	8.2	86.0	8.2	190.0	9.4	475.0	8.9	1000.0	9.2
4.4	10.0	25.8	9.7	54.9	8.3	90.0	8.8	200.0	9.8	500.0	9.4	1050.0	9.7
4.6	10.4	26.7	10	57.7	9.3	93.0	9.4	210.0	10.3	525.0	9.8	1100.0	10.2
4.7	10.6	28.3	10.6	60.5	10.4	96.0	10.3	220.0	10.8	550.0	10.3	1150.0	10.6
5.0	11.3	30	11.3	63.4	11.4	100.0	12.5	230.0	11.3	575.0	10.8	1200.0	11.1

## TECHNICAL SPECIFICATIONS

General	
Connection Size Options	3/4" NPT Female
	1" NPT Female
	1-1/2" NPT Female
	2" 150lb Flange
	3" 150lb Flange
	4" 150lb Flange
	6" 150lb Flange
Materials	Type 316 Stainless Steel
Pressures	
Inlet Supply Pressure	Maximum Operating Pressure: 150 psi (15 bar)
Pressure Drop Across Model	Recommended Max. Pressure Drop: 15 psi (1 bar)   Recommended Min. Pressure Drop: 5 psi (0.35 bar)

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# ARMSTRONG NANOBUBBLE GENERATOR

## WRITTEN SPECIFICATIONS

**Category:** Water Processing Equipment

**Type:** Nanobubble Generator

**Model:** ANG

### 1.0 General

- 1.1 Nanobubble Generator shall have an inlet at one end, an outlet at the opposite end, and a conditioning element between the inlet and outlet.
- 1.2 Nanobubble Generator shall be built with either threaded or flanged connections for either sidestream or inline installation.
- 1.3 Nanobubble Generator shall be constructed of 316L stainless steel.
- 1.4 Nanobubble Generator shall be capable of producing nanobubbles sized at 100nm.
- 1.5 Nanobubble Generator shall function as a static mixer and shall not require electrical components.

### 2.0 Nanobubble Generator shall have the following operational specifications:

- 2.1 Flow rate of 1 to 1,150 GPM (4,353 LPM) based on sizing criteria per model
- 2.2 Maximum 15 psig (1 barg) drop
- 2.3 Water operating pressure of 5 - 150 psig (0.35 - 10.3 barg)
- 2.4 Maximum allowable water pressure of 200 psig (13.4 barg)
- 2.5 Required velocity of 2 - 15 FPS (0.6 - 4.5 MPS)

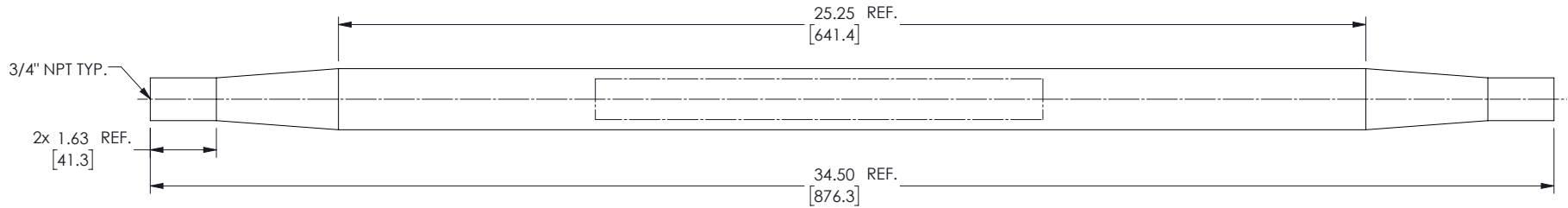
### 3.0 Nanobubble Generator shall be built to ASME Section IV B31.1, B31.3.

### 4.1 Nanobubble Generator shall carry a 5-year warranty.

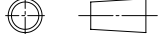

# APPROVAL

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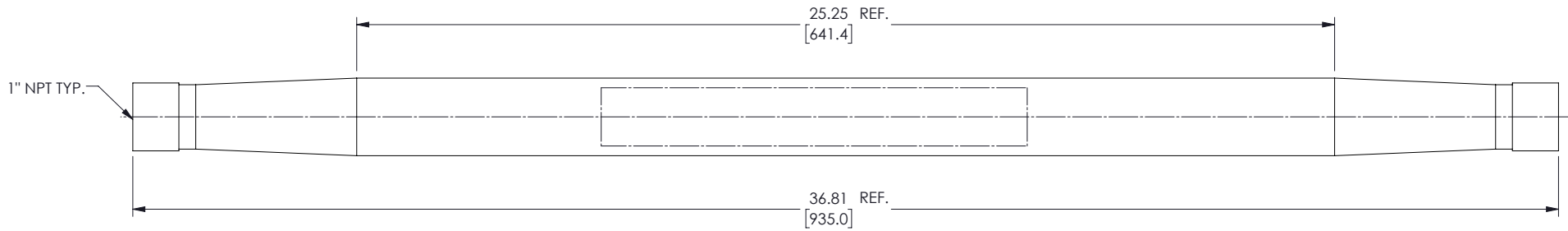
NOTES:  
1. MAX. WATER PRESSURE 150 PSI [10.3].

 DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED DIMENSIONING ENGLISH [mm]				ARMSTRONG INTERNATIONAL Copyright © 2010 ARMSTRONG INTERNATIONAL, INC.	
				ANG20 3/4 NPT X 1-1/2 OD SS 316	
FRACTIONAL ± 1/64 ANGULAR: ± 2		NAME	DATE	MATERIAL	SHEET 1 OF 1
DECIMAL .XXXX ± .0005 .XXX ± .005 .010 .XX ± .015 .10 .X ± .3		DRAWN	12/14/2023		
		RELEASED		CN85171	REVA DWG. SALES



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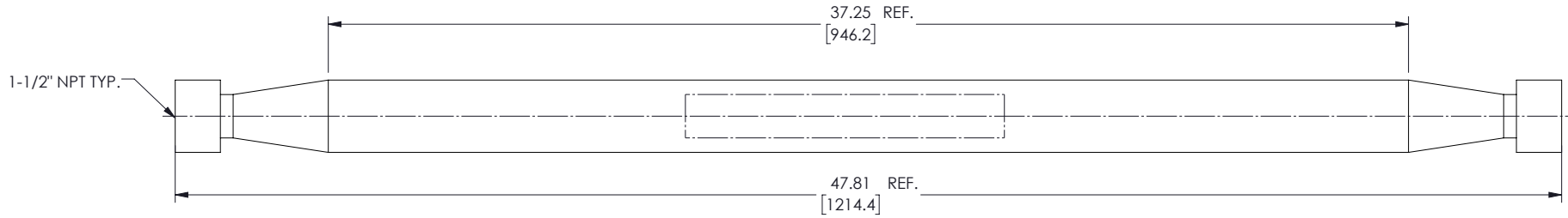
NOTES:  
1. MAX. WATER PRESSURE 150 PSI [10.3].

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DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED				ANG25 1 NPT X 2 OD SS 316	
DIMENSIONING ENGLISH [mm]				MATERIAL	
FRACTIONAL ± 1/64 ANGULAR: ± 2				SHEET 1 OF 1	
DECIMAL .0005 .XXX ± .005 .010 .XX ± .015 .10 .X ± .3		NAME DRAWN Ross Pulfer	DATE 12/14/2023	REV. A	DWG. SALES
		RELEASED		CN85171	



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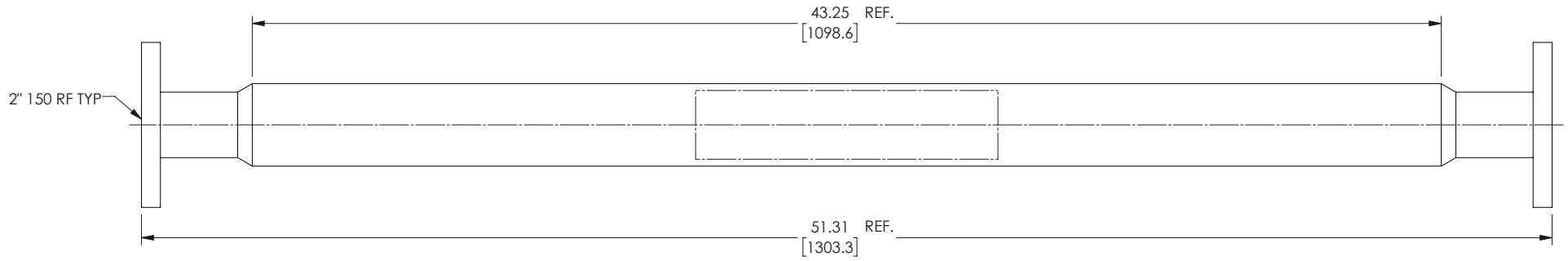
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			ANG40 1-1/2 NPT X 2-1/2 OD SS 316	
DIMENSIONING ENGLISH [mm]		NAME Ross Pulifer	DATE 12/14/2023	MATERIAL
FRACTIONAL ± 1/64 ANGULAR: ± 2				
DECIMAL    .XXXX ± .0005    ---- .XXX ± .005    .010 .XX ± .015    .10 .X                .3		DRAWN	1/5/2024	SHEET 1 OF 1
		RELEASED		REVA    DWG.    SALES



# APPROVAL

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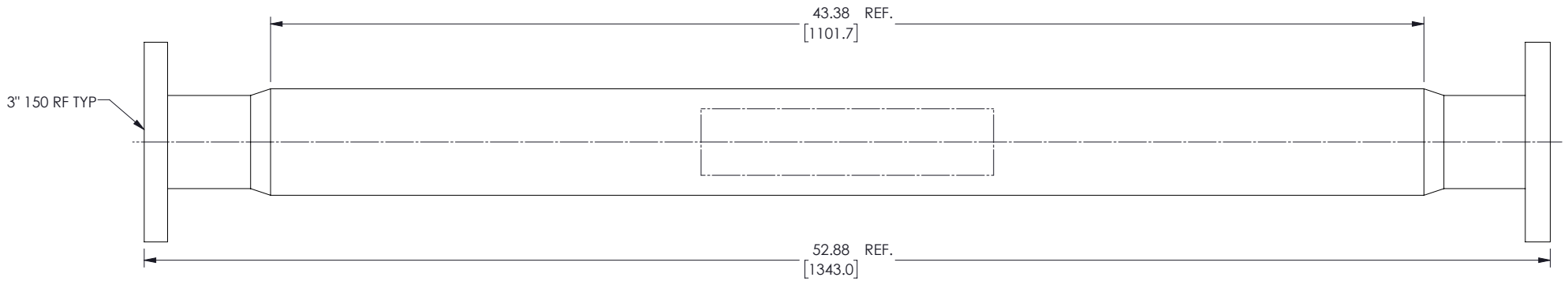
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				ANG50 2 150 RF X 3 OD SS 316	
FRACTIONAL ± 1/64 ANGULAR: ± 2		NAME Ross Pulifer		DATE 12/14/2023	
DECIMAL .xxx ± .005 .xx ± .015 .x ± .3		MATERIAL CN85171		SHEET 1 OF 1	
RELEASED		REV A		DWG. SALES	




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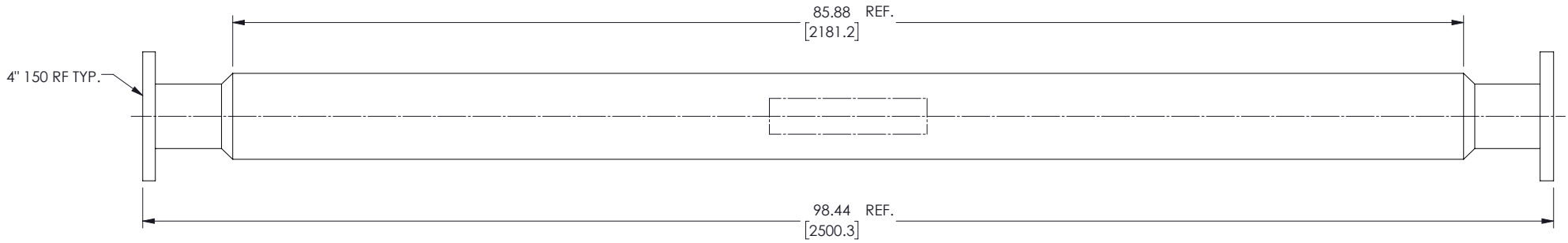
 				ARMSTRONG INTERNATIONAL Copyright © 2010 ARMSTRONG INTERNATIONAL, INC.	
				ANG80 3 150 RF X 4 OD SS 316	
DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED DIMENSIONING ENGLISH [mm] FRACTIONAL ± 1/64 ANGULAR: ± 2		NAME Ross Pulfer	DATE 12/14/2023	MATERIAL	
DECIMAL .XXX ± .005 .10 .XX ± .015 .10 .X ± .3		DRAWN	RELEASED	CN85171	SHEET 1 OF 1 REV. A DWG. SALES





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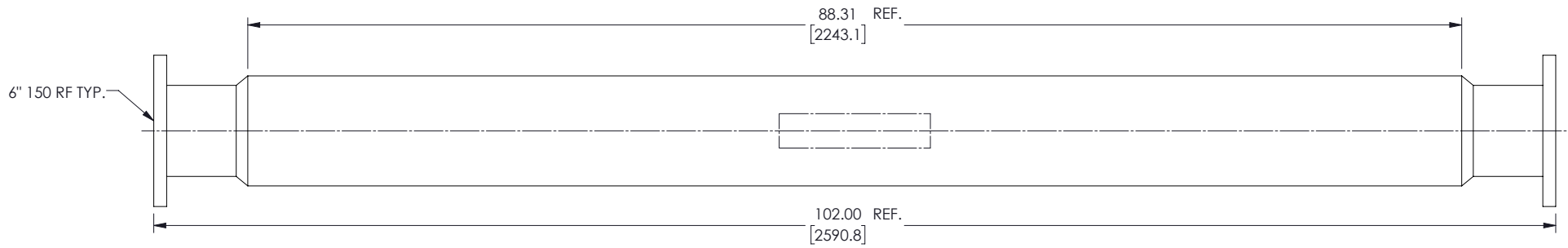
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DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED				ANG100 4 150 RF X 6 OD SS 316	
DIMENSIONING ENGLISH [mm]				MATERIAL	
FRACTIONAL ± 1/64 ANGULAR: ± 2				SHEET 1 OF 1	
DECIMAL .0005 .XXX ± .005 .010 .XX ± .015 .10 .X ± .3		NAME DRAWN Ross Pulifer	DATE 12/14/2023	REV A	DWG.
RELEASED		CN85171		SALES	




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BY: \_\_\_\_\_ DATE: \_\_\_\_\_

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1. MAX. WATER PRESSURE 150 PSI [10.3].

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						ANG150 6 150 RF X 8 OD SS 316	
DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED DIMENSIONING ENGLISH [mm]				NAME Ross Pulifer		DATE 12/14/2023	
FRACTIONAL ± 1/64 ANGULAR: ± 2				MATERIAL CN85171		SHEET 1 OF 1	
DECIMAL .XXXX ± .0005 .XXX ± .005 .010 .XX ± .015 .10 .X ± .3				RELEASED		REV A DWG. SALES	