

AIRO™ Air Atomizing Nozzles

for good atomization of both
light and heavy fuels at higher flow rates



The industrial Airo Nozzle is an air atomizing nozzle designed to handle #2, #4, and preheated #5 and #6 fuels. Air is supplied at relatively low pressure to provide the energy for atomization. Air atomizing nozzles provide good atomization of fuels too viscous for pressure atomizing nozzles. They can also provide finer breakup if sufficient air is available.

The Airo Nozzle is of the internal mixing type. That means that the air and fuel are piped separately to the nozzle and are mixed just before they enter the atomizing slots. The air under pressure is mixed thoroughly with the fuel in the swirl chamber so that a uniform emulsion is discharged through the orifice. The resultant spray is well atomized in a solid cone pattern.

The cost of equipment with air atomizing nozzles is higher than for equivalent pressure atomizing nozzles because of the addition of the compressor. The power requirement is also higher because of the extra power required to compress air. These disadvantages are offset, however, by the advantages in handling of heavy fuels.

APPLICATIONS

- The Airo Nozzle may be used as a fixed discharge nozzle. (Fuel metering is discussed in a following heading.)
- This nozzle may be arranged for two-stage firing if desired.
- This type of nozzle may be arranged for complete modulating over the desired flow range.
- The Airo Nozzle will handle light fuels at any flow rate from 2 GPH and up. The proper nozzle must be selected for each range.
- The Industrial Airo Nozzle will handle #5 oil or #6 oil preheated to approximately 100 SSU. Above 20 GPH, higher viscosities may be handled if sufficient air is available.

SPRAY CHARACTERISTICS

- Uniform solid cone-spray angle varies with air pressure and flow. A separate metering device, such as an orifice, metering pump or valve is required.
- Large flow passages greatly reduce clogging.
- With the internal mixing type of nozzle, the spray angle changes with the fuel-air ratio (pounds of fuel per pound of atomizing air). The spray angle is wider at high fuel-air ratios. For example if the spray angle is 75° at a fuel-air ratio of 30 to 1, it may be reduced to 60° at a fuel-air ratio of 10 to 1.
- Higher air pressures produce narrower spray angles.
- Droplet size is smaller at higher air pressures and narrower spray angles.
- Constant spray angles may be obtained by modulating air pressure with the fluid flow.

ADAPTERS

Adapters are optional and, if required, must be ordered separately. Adapters come with seals installed.

Hex Size	Part Number	Material
7/8	23034-1	Brass
	23034-2	Stainless steel
1 1/4	30678-1	Mild steel
	30678-2	Stainless steel
	30678-3	Inconel

INSTALLATION:

FUEL METERING

- A fixed firing rate may be obtained by supplying fuel by a pressure pump through a fixed metering orifice to the nozzle.
- Two stage operation may be obtained by the use of two metering orifices in the fuel line, one of them in series with a solenoid valve. This solenoid valve will be actuated by pressure or temperature.
- A positive fuel metering pump of the piston type is satisfactory for single stage operation.
- Modulating metering may be obtained by the use of a fuel pump in combination with a modulating valve.
- Metering *cannot* be done with this type of nozzle by balancing fuel pressure against air pressure.

METHODS OF METERING FUEL

- Metering pump.
- Constant pressure pump and metering orifice in the line.
- Constant pressure pump and motorized modulating valve actuated by steam pressure, water or process temperature.

AIR COMPRESSOR

- May be rotary type for pressures up to 25 PSI or as rated by manufacturer.
- May be piston type for higher pressure.
- May have built in pressure relief valve.
- Must have enough capacity for the nozzle requirement.

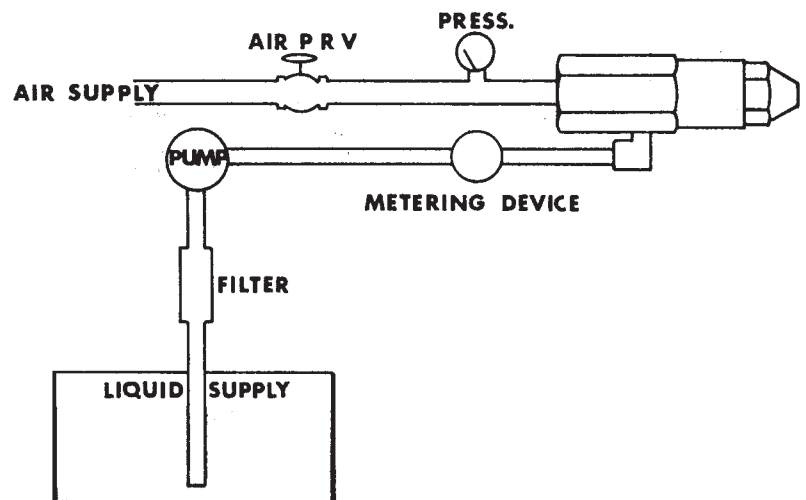
SPECIAL CONDITIONS:

It may be necessary when burning residual fuels to provide some means for heating the nozzle and fuel line before starting. It may also be advantageous to provide air purge of the fuel line to the nozzle on shut-down.

It is *always* advisable to make certain that air flow through the nozzle is established *before* fuel is supplied. This will prevent backing up of fuel into the air line and equipment. It will also insure good atomization at the start.

SERVICE:

- Since the fuel and air passages in this type of nozzle are quite large, clogging is not a serious problem. It is recommended, however, that both the air and the fuel be filtered to remove lint and large particles of foreign matter. Clogging of air passages or fuel passages will result in off-center fires.
- Damage to the orifice may result in a streaky fire, an off-center fire, or drooling.



CONSTRUCTION & MATERIALS:

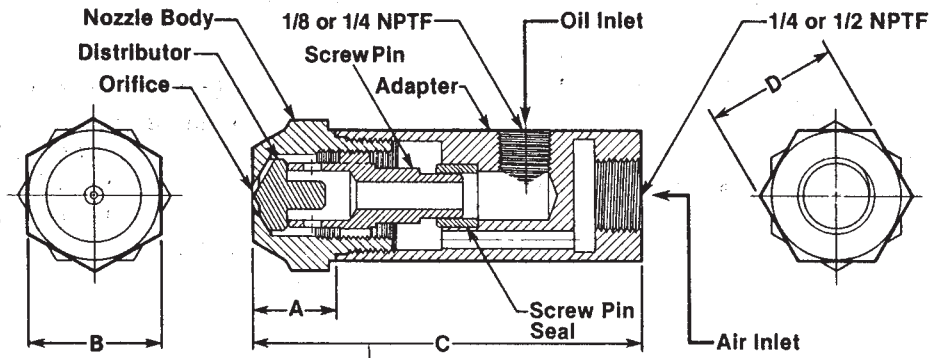
The Airo nozzle is made up of three basic parts, available in the following materials:

- **NOZZLE BODY** – Brass or stainless steel.
Thread sizes: 3/4"-20 UNEF on #30615 and 1-1/8"-18 UNEF on #30616.
- **DISTRIBUTOR** – Brass, stainless steel, or tungsten carbide (requires special body with replaceable tungsten carbide orifice disc, integral with body.)
- **SCREW PIN** – Brass or stainless steel.

NOTE: Contact factory for other material requirements.

DIMENSIONS AND WEIGHTS FOR AIRO NOZZLES

Nozzle Type	Material	Dimensions (Inches)				Inlet Sizes		Weight (Ounces)
		A	B	C	D	Air	Liquid	
30615 with 23034-1 Adapter	Brass	.625	.875 Hex	3.125	.875 Hex	1/4 NPT	1/8 NPT	7
30615 with 23034-2 Adapter	Stainless Steel	.625	.875 Hex	3.125	.875 Hex	1/4 NPT	1/8 NPT	8
30616 with 30678 Adapter	Stainless Steel	.800	1.25 Hex	3.620	1.25 Hex	1/2 NPT	1/4 NPT	9



Airo Nozzle Assembly
P/N 30615 (.875" Hex) & P/N 30616 (1.250" Hex)

1 1/4 " AIRO NOZZLE CAPACITIES

Part Number	Customer or Old Catalog PN	Flow Rate (GPH)	Body Material	Screw Pin Type and Material	Air Press (PSI)	Air Flow @ Max Disch (PPH)	Spray Angle (°)
30616-1	9078-60	60	SS	SS	30.0	14.5-16.0	70°
30616-4	9078-70	70	SS	SS	30.0	16.0-17.5	70°
30616-5	12581-70	70	SS	Thd'd, SS	30.0	16.0-17.5	70°
30616-8	9078-80	80	SS	SS	30.0	17.0-18.5	70°
30616-9	12581-80	80	SS	Thd'd, SS	30.0	17.0-18.5	70°
30616-11	15293-80	80	HSS	HSS	30.0	17.0-18.5	70°
30616-12	27932	80	SS	SS	30.0	20.0-22.0	75-85°
30616-14	9078-100	100	SS	SS	30.0	21.0-22.5	70°
30616-15	12581-100	100	SS	Thd'd, SS	30.0	21.0-22.5	70°
30616-17	15293-100	100	HSS	HSS	30.0	21.0-22.5	70°
30616-19	17022	100	Incon	Incon	30.0	21.0-22.5	70°
30616-20	9078-120	120	SS	SS	30.0	23.5-25.0	70°
30616-21	12581-120	120	SS	Thd'd, SS	30.0	23.5-25.0	70°
30616-24	9078-130	130	SS	SS	30.0	25.0-26.5	70°
30616-25	12581-130	130	SS	Thd'd, SS	30.0	25.0-26.5	70°
30616-27	15293-150	130	HSS	HSS	35.0	25.0-26.5	70°
30616-29	9078-150	150	SS	SS	30.0	26.0-27.5	70°
30616-30	12581-150	150	SS	Thd'd, SS	30.0	26.0-27.5	70°
30616-32	15293-150	150	HSS	HSS	30.0	23.0-24.5	70°
30616-33	19279	150	Incon	Thd'd, Incon	30.0	26.0-27.5	70°
30616-34	19810	150	Incon	Incon	30.0	26.0-27.5	70°
30616-35	9078-200	150	SS	SS	20.0	25.0-26.5	70°
30616-36	12581-200	150	SS	Thd'd, SS	20.0	25.0-26.5	70°
30616-39	14788	150	SS	SS	25.0	23.0-25.0	65°

Abbreviations: HSS—Hardened Stainless Steel Thd'd—Threaded BR—Brass Incon—Inconel
SS—Stainless Steel

7/8" Airo Nozzle Capacities

Part Number	Flow Rate (GPH)	Body Material	Screw Pin Material	Air Pressure (PSI)	Air Flow @ max PPH	Spray Angle Degrees
30615-001	10	Brass	Unthreaded Brass	20	4.6 - 4.9	70 - 80
30615-002	10	303 SST	Unthreaded 303 SST	20	4.6 - 4.9	70 - 80
30615-003	10	HT 303 SST	Unthreaded 303	20	4.6 - 4.9	70 - 80
30615-004	10	303 SST	Unthreaded Brass	20	4.6 - 4.9	70 - 80
30615-005	10	303 SST	Threaded Brass	20	4.6 - 4.9	70 - 80
30615-006	10	Brass	Threaded Brass	20	4.6 - 4.9	70 - 80
30615-007	10	303 SST	Threaded 303 SST	20	4.6 - 4.9	70 - 80
30615-009	10	Inconel	Threaded AMS 5665	20	4.6 - 5	60 - 70
30615-010	15	Brass	Unthreaded Brass	20	4.6 - 5	70 - 80
30615-011	15	303 SST	Unthreaded 303 SST	20	4.6 - 5	70 - 80
30615-012	15	HT 303 SST	Unthreaded 303 SST	20	4.6 - 5	70 - 80
30615-013	15	303 SST	Unthreaded Brass	20	4.6 - 5	70 - 80
30615-014	15	303 SST	Threaded Brass	20	4.6 - 5	70 - 80
30615-015	20	Brass	Unthreaded Brass	20	6 - 6.3	70 - 80
30615-016	20	303 SST	Unthreaded 303	20	6 - 6.3	70 - 80
30615-017	20	HT 303 SST	Unthreaded 303 SST	20	6 - 6.3	70 - 80
30615-018	20	303 SST	Unthreaded Brass	20	6 - 6.3	70 - 80
30615-019	20	303 SST	Threaded Brass	20	6 - 6.3	70 - 80
30615-020	20	Brass	Threaded Brass	20	6 - 6.3	70 - 80
30615-021	20	303 SST	Threaded 303 SST	20	6 - 6.3	70 - 80
30615-023	25	Brass	Unthreaded Brass	25	6.1 - 6.4	70 - 80
30615-024	25	303 SST	Unthreaded 303 SST	25	6.1 - 6.4	70 - 80
30615-025	25	HT 303 SST	Unthreaded 303 SST	25	6.1 - 6.4	70 - 80
30615-026	25	303 SST	Unthreaded Brass	25	6.1 - 6.4	70 - 80
30615-027	25	303 SST	Threaded 303 SST	25	6.1 - 6.4	70 - 80
30615-028	30	Brass	Unthreaded Brass	25	6.8 - 7.1	70 - 80
30615-029	30	303 SST	Unthreaded 303	25	6.8 - 7.1	70 - 80
30615-030	30	HT 303 SST	Unthreaded 303 SST	25	6.8 - 7.1	70 - 80
30615-031	30	303 SST	Unthreaded Brass	25	6.8 - 7.1	70 - 80
30615-032	30	303 SST	Threaded Brass	25	6.8 - 7.1	70 - 80
30615-033	30	Brass	Threaded Brass	25	6.8 - 7.1	70 - 80
30615-034	30	303 SST	Threaded 303 SST	25	6.8 - 7.1	70 - 80
30615-036	30	303 SST	Unthreaded Brass	30	9.5 - 10.5	70 - 80
30615-037	30	303 SST	Unthreaded Brass	30	10.2 - 11	70 - 80
30615-038	35	Brass	Unthreaded Brass	25	8 - 8.4	70 - 80
30615-039	35	303 SST	Unthreaded 303	25	8 - 8.4	70 - 80
30615-040	35	HT 303 SST	Unthreaded 303 SST	25	8 - 8.4	70 - 80
30615-041	35	303 SST	Threaded Brass	25	8 - 8.4	70 - 80
30615-042	35	303 SST	Threaded Brass	25	8 - 8.4	70 - 80
30615-043	35	Brass	Unthreaded Brass	30	16 - 18	70 - 80
30615-044	40	Brass	Unthreaded Brass	30	8.5 - 8.9	70 - 80
30615-045	40	303 SST	Unthreaded 303	30	8.5 - 8.9	70 - 80
30615-047	40	Brass	Threaded Brass	30	8.5 - 8.9	70 - 80
30615-048	40	303 SST	Threaded 303 SST	30	8.5 - 8.9	70 - 80
30615-050	40	303 SST	Unthreaded Brass	30	8.5 - 8.9	70 - 80
30615-051	40	303 SST	Threaded Brass	30	8.5 - 8.9	70 - 80
30615-052	40	303 SST	Unthreaded Brass	30	13.5 - 14.5	60 - 70
30615-053	40	Inconel	Threaded AMS 5665	30	8.5 - 9.7	60 - 70
30615-054	40	303 SST	Unthreaded Brass	30	10 - 11	70 - 80
30615-055	50	Brass	Unthreaded Brass	30	9.5 - 10.5	65 - 75
30615-056	50	303 SST	Unthreaded 303	30	9.5 - 10.5	65 - 75
30615-057	50	HT 303 SST	Unthreaded 303 SST	30	9.5 - 10.5	65 - 75
30615-058	50	303 SST	Unthreaded Brass	30	9.5 - 10.5	65 - 75
30615-059	50	303 SST	Threaded Brass	30	9.5 - 10.5	65 - 75
30615-060	50	303 SST	Threaded 303 SST	30	9.5 - 10.5	60 - 70
30615-062	50	303 SST	Unthreaded Brass	30	9.5 - 10.5	70
30615-063	50	Inconel	Unthreaded AMS	30	9.5 - 10.5	60 - 70
30615-064	50	Brass	Unthreaded Brass	30	17 - 18.5	80
30615-069	20	303 SST	Unthreaded 303 SST	20	6 - 6.3	70 - 80
30615-071	25	303 SST	Unthreaded 303	25	6.1 - 6.4	70 - 80
30615-073	30	303 SST	Unthreaded 303 SST	25	6.8 - 7.1	70 - 80
30615-075	35	303 SST	Unthreaded 303 SST	25	8 - 8.4	70 - 80
30615-077	40	303 SST	Unthreaded 303	30	8.5 - 8.9	70 - 80
30615-079	40	316 SST	Threaded 316 SST	30	8.5 - 8.9	70 - 80
30615-081	30	303 SST	Unthreaded Brass	30	10.2 - 11	70 - 80
30615-082	30	303 SST	Threaded 303 SST	30	10.2 - 11	70 - 80
30615-083	10	HT 303 SST	Unthreaded 303 SST	20	4.6 - 4.9	70 - 80
30615-084	30	303 SST	Unthreaded 303 SST	30	10.2 - 11	70 - 80
30615-085	40	303 SST	Unthreaded 303	30	13.5 - 14.5	60 - 70
30615-086	100	Brass	Unthreaded Brass	35	20 - 22	
30615-087	120	Brass	Unthreaded Brass	35	19 - 21	
30615-088	150	Brass	Unthreaded Brass	35	16 - 18	
30615-098	35	303 SST	Unthreaded 303 SST	30	16 - 18	80
30615-099	15	303 SST	Threaded 303 SST	20	4.6 - 5	70 - 80
30615-100	10	Brass	Unthreaded Brass	20	6.6 - 7	70 - 80
30615-101	50	303 SST	Unthreaded 303 SST	30	17 - 18.5	80
30615-102	120	303 SST	Unthreaded 303 SST	35	19 - 21	
30615-103	150	303 SST	Unthreaded 303	35	16 - 18	
30615-104	100	303 SST	Unthreaded 303 SST	35	20 - 22	
30615-105	20	Inconel	Threaded AMS 5665	20	6 - 6.3	70 - 80
30615-106	40	Inconel	Threaded AMS 5665	30	89.7 - 10.8	70 - 80
30615-107	10	303 SST	Unthreaded 303 SST	20	4.6 - 4.9	70 - 80

ORDERING INSTRUCTIONS

WHEN ORDERING AIRO NOZZLES, be sure to include both part number and description. To find part number and dash number, see the nozzle capacity charts. First locate the correct nozzle size and capacity, then select proper body material and screw pin type. NOTE: Please specify distributor material if different than screw pin material.

EXAMPLE: A 1-1/4" 100 GPH stainless steel nozzle with stainless steel, threaded screw pin is PN 30616-15. It will be shipped with a stainless steel distributor.

Order adapter separately. Be sure to specify part number and description.