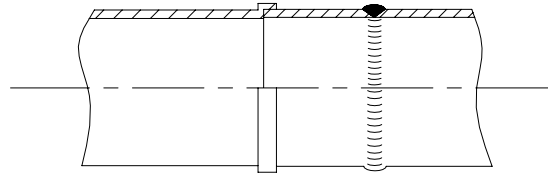


ORBITAL WELD PERMANENT FITTING



DESIGN CONCEPT:

Weld fitting design offers smallest envelope, lightest weight and strongest joint among all other mechanical fitting joints. Navy test results showed an average welded joint has a durable fatigue life up to 150% higher than mechanically attached fitting joints. No wonder this concept is widely used in commercial and military programs worldwide.

The weld fitting end design has the simplest geometrical contour with an integral T-ring. It provides alignment for the fitting and tubing and is also a filler material for welding.

Fitting and tubing ends shall be cleaned prior to welding; one of the simplest cleaning methods is to spray acetone to the joint and it will quickly evaporate.

Weld fittings are easily to be welded by Orbital weld tooling with electronic memories to reproduce accurate repeated weld each time. It minimizes X-ray inspection to a large degree. Different tooling is available for bench production weld or portable welding. The unified welded joint provides a positive fluid sealing.

DESIGN ADVANTAGES:

- Unified weld joint offers positive sealing.
- Offers smallest envelope, lightest weight and strongest fitting joint.
- Electronic memories produce accurate repeated weld each time.
- Weld tooling requires lowest maintenance cost by replacing tungsten only.
- Integral T-ring offers self-alignment for fitting and tubing butting to support proper welding.

STANDARD PROCUREMENT SPECIFICATIONS FOR ORBITAL WELD FITTINGS

SAE AS1576 and/or AS4459 specifications define Form, Fit, Function and Procurement requirements for Orbital Tube Weld fittings.

QUALIFICATION AND APPROVAL STATUS

Airdrome fittings were tested per SAE AS1576 and AS4459, Boeing 27M107 and BPS-F-125, Lockheed 5PTV5401 and Northrop 37A050 specifications.

The fittings are approved for use in various space, military, and commercial programs at Allison, Bell, Boeing, Commercial/Defense/Space Group, General Electric, Honeywell, Lockheed, Northrop/Grumman, Sikorsky, etc.

TOOLING

Various welding equipment manufacturers offer Orbital Weld tooling and training.

FITTING MATERIAL SELECTION

The Adapters or Permanent Orbital Tube Weld fittings are offered in the following applicable materials for use with various tubing materials, fluid, and operating temperature:

MATERIAL AND CODING

Titanium Alloy	Code T	Indicates 6AL-4V per AMS4928 (all except Dgco 'Seal parts) and AMS4965 (for'Dgco 'Seal parts only).
Cres	Code J	Indicates 304 per AMS-QQ-S-763 (all except Dgco 'Seal parts).
	Code K	Indicates 316 per AMS-QQ-S-763 (all except Dgco 'Seal parts).
	Code N	Indicates Inconel 718 per AMS5663.
	Code P	Indicates 17-4PH, H-1075 cond. per AMS5643.
	Code R	Indicates 321 per AMS-QQ-S-763 (all except Dgco 'Seal parts).
	Code S	Indicates 347 per AMS-QQ-S-763 (all except Dgco 'Seal parts).
	Code V	Indicates 15-5PH, H-1075 cond., per AMS5659.
	Code JL	Indicates 304L per AMS-QQ-S-763 (all except Dgco 'Seal parts).
Code KL	Indicates 316L per AMS-QQ-S-763 (all except Dgco 'Seal parts).	
Code -	Indicates 21-6-9 per AMS5656.	
Aluminum Alloy	Code D	Indicates 6061-T6 per QQ-A-225/8 (all except Dgco 'Seal parts)

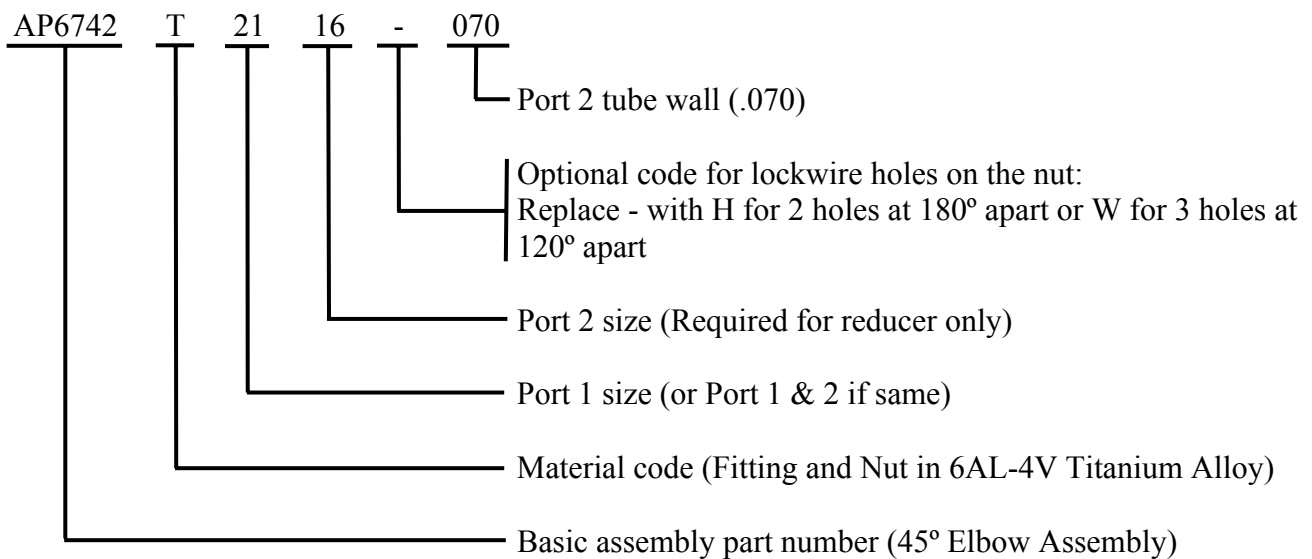
SIZE, MATERIAL, AND TUBE WALL VERSUS OPERATING PRESSURE

Fitting/tubing operating pressures vary according to size and material. The following shows standard size range and corresponding operating pressures:


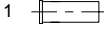
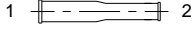


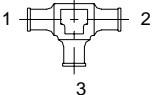
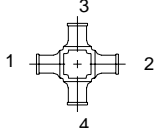
FITTING SIZE	TUBE O.D.	OPERATING PRESSURE (psi) PER FITTING MATERIAL				
		FLARED & FLARELESS SEPARABLE WELD FITTINGS			BEAM SEAL SEPARABLE WELD FITTINGS	
		Ti Alloy	Cres	Alum Alloy	Ti Alloy	Cres
03	3/16	4000	3000	1500	8000	3000
04	1/4	4000	3000	1500	8000	3000
05	5/16	4000	3000	1500	8000	3000
06	3/8	4000	3000	1500	8000	3000
07	7/16	4000	3000	1500	8000	3000
08	1/2	4000	3000	1500	8000	3000
09	9/16	4000	3000	1500	5000	3000
10	5/8	4000	3000	1500	5000	3000
11	11/16	4000	3000	1500	5000	3000
12	3/4	4000	3000	1500	5000	3000
13	13/16	4000	3000	1500	5000	3000
14	7/8	4000	3000	1500	5000	3000
15	15/16	4000	3000	1500	5000	3000
16	1	4000	3000	1500	5000	3000
20	1-1/4	4000	3000	1500	4000	3000
24	1-1/2	2000	2000	1500	2000	2000

Note: Beam Seal port size callout for tube O.D. 1-1/4 & 1-1/2 shall be 21 & 25 respectively.
(See example of part number).

EXAMPLE OF PART NUMBER FOR ORDERING FITTINGS



Note: Contact Airdrome Precision Components for special fitting configuration, material and/or size not listed in this catalog.

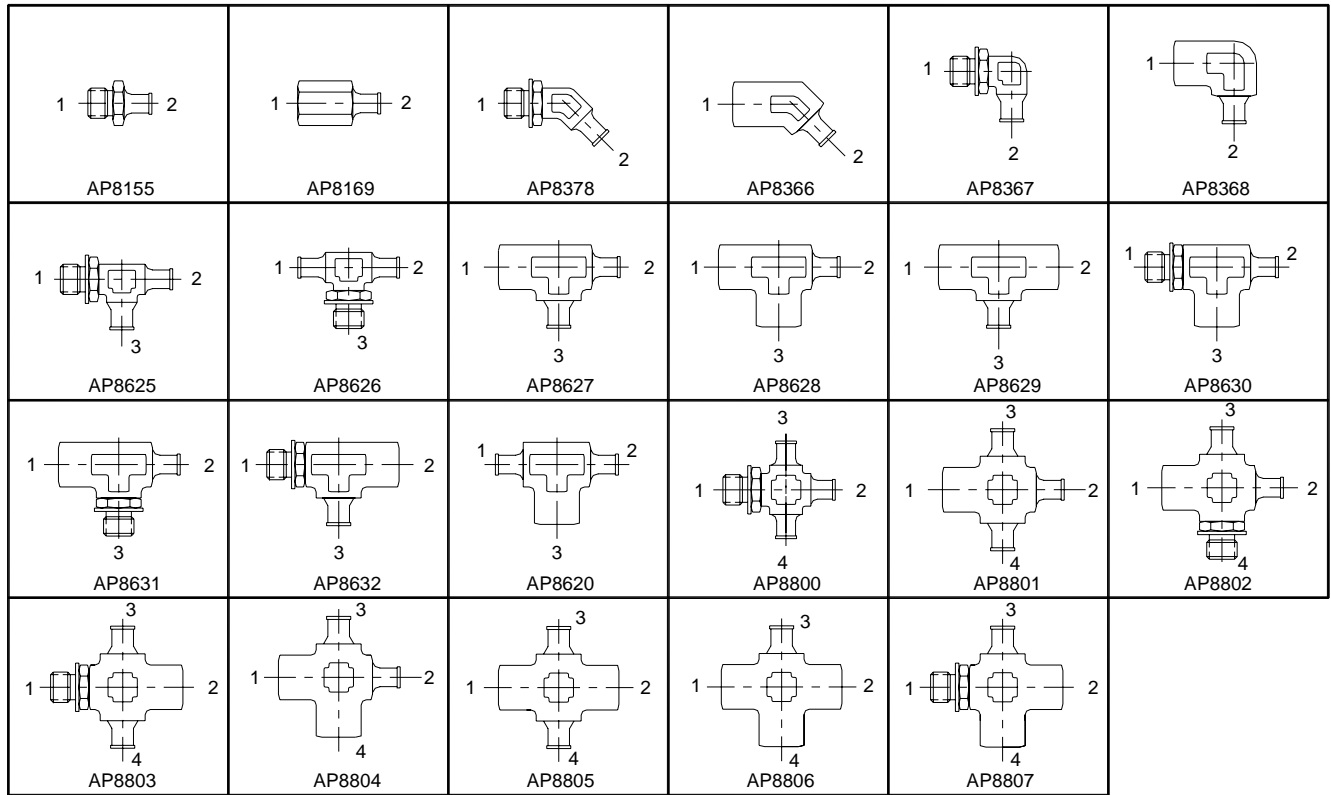
 AP8117	 AP8015	 AP8117	 AP8351	 AP8343
 AP8573	 AP8784			

Orbital Tube Weld Fittings and Equivalent Industry Standards

Fitting Shape	Port Sequence for Airdrome Part Number only (See example of Part No.)				Airdrome Standard	Aerospace Standard
	1	2	3	4		
T-Ring					AP8117	AS1580
						AS1893
Cap	W				AP8015	
Straight	W	W			AP8117	AS1585
45° Elbow	W	W			AP8351	
90° Elbow	W	W			AP8343	AS1584
Tee	W	W	W		AP8573	AS1583
Cross	W	W	W	W	AP8784	

Note: 1. W = Orbital Tube Weld port.

2. The AP and AS have the same configuration but are not interchangeable fittings.

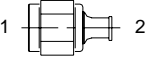
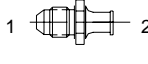
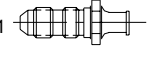
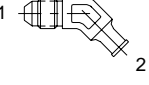
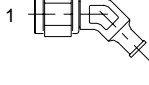
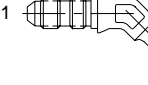
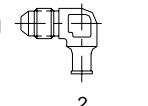
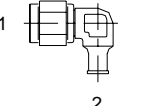
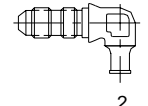
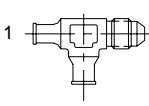
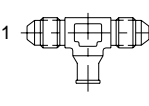
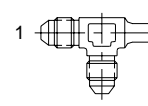
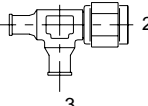
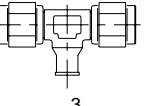
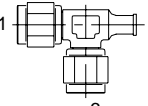
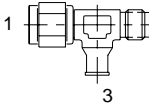
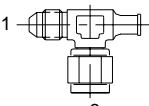
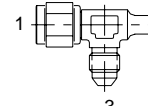
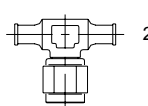
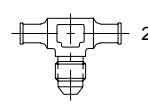
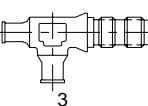
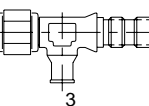
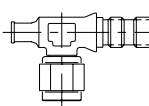
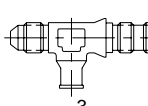
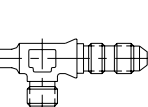
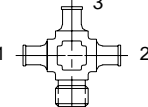
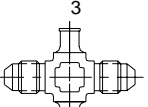
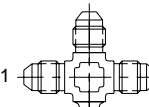
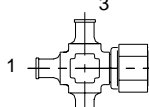
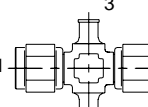
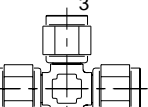
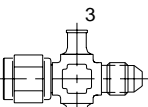
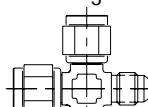
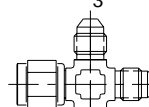
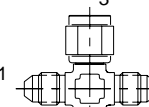
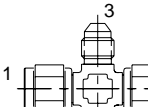
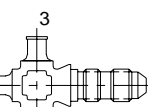
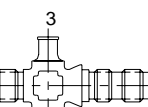
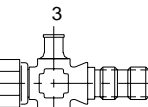
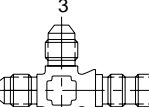
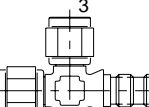
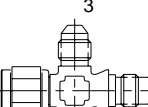
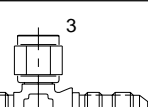
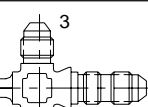
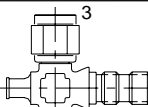
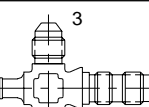
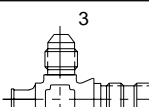
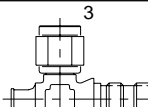


Adapters for Orbital Tube Weld to Boss Fittings

Fitting Shape	Port Sequence for Airdrome Part Number only (See example of Part No.)				Airdrome Standard
	1	2	3	4	
Straight	M	W			AP8155
	F	W			AP8169
45° Elbow	M	W			AP8378
	F	W			AP8366
90° Elbow	M	W			AP8367
	F	W			AP8368
Tee	M	W	W		AP8625
	W	W	M		AP8626
	F	W	W		AP8627
	F	W	F		AP8628
	F	F	W		AP8629
	M	W	F		AP8630
	F	W	M		AP8631
	M	F	W		AP8632
	W	W	F		AP8620
Cross	M	W	W	W	AP8800
	F	W	W	W	AP8801
	F	W	W	M	AP8802
	M	F	W	W	AP8803

	F	W	W	F	AP8804
	F	F	W	W	AP8805
	F	F	W	F	AP8806
	M	F	W	F	AP8807

Note: 1. F = Female Boss port, M = Male Boss port,
W = Orbital Tube Weld port.

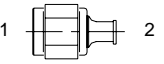
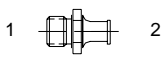
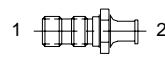
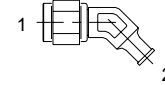
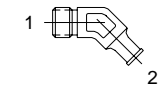
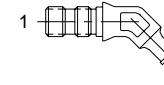
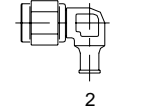
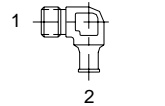
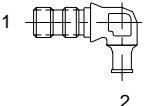
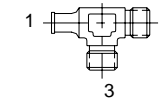
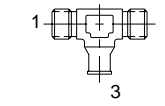
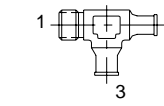
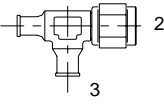
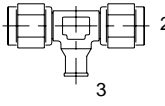
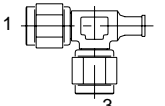
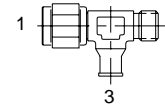
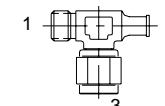
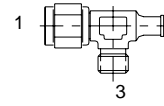
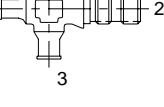
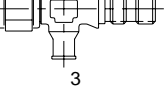
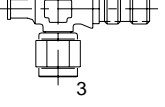
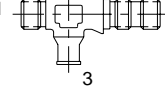
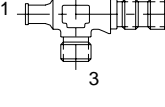
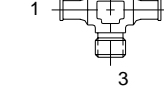
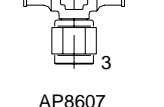
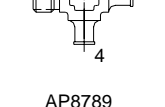
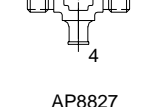
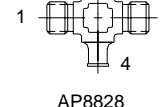
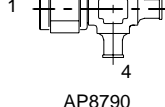
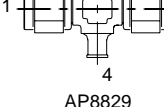
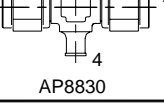
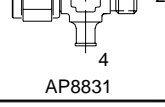
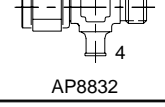
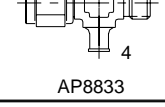
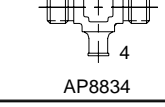
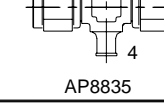
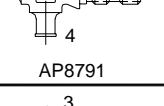
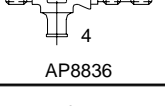
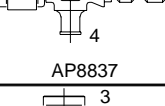
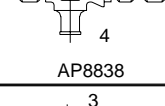
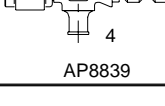
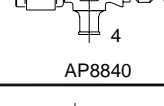
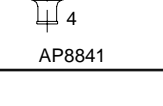
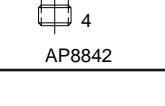

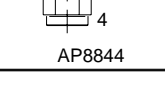
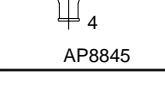
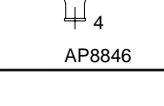
 AP8115	 AP8156	 AP8157	 AP8356	 AP8357	 AP8358
 AP8374	 AP8329	 AP8346	 AP8601	 AP8633	 AP8596
 AP8602	 AP8634	 AP8635	 AP8595	 AP8636	 AP8597
 AP8599	 AP8553	 AP8603	 AP8637	 AP8638	 AP8639
 AP8640	 AP8781	 AP8808	 AP8809	 AP8787	 AP8795
 AP8810	 AP8811	 AP8812	 AP8813	 AP8814	 AP8815
 AP8788	 AP8816	 AP8817	 AP8818	 AP8819	 AP8820
 AP8821	 AP8822	 AP8823	 AP8824	 AP8825	 AP8826

Adapters for Orbital Tube Weld to 37° Flared Fittings

Fitting Shape	Port Sequence for Airdrome Part Number only (See example of Part No.)				Airdrome Standard
	1	2	3	4	
Straight	F	W			AP8115
	M	W			AP8156
	B	W			AP8157
45° Elbow	M	W			AP8356
	F	W			AP8357
	B	W			AP8358
90° Elbow	M	W			AP8374
	F	W			AP8329
	B	W			AP8346
Tee	W	M	W		AP8601
	M	M	W		AP8633
	M	W	M		AP8596
	W	F	W		AP8602
	F	F	W		AP8634
	F	W	F		AP8635
	F	M	W		AP8595
	M	W	F		AP8636
	F	W	M		AP8597
	W	W	M		AP8599
	W	W	F		AP8553
	W	B	W		AP8603
	F	B	W		AP8637
	W	B	F		AP8638
	M	B	W		AP8639
	W	B	M		AP8640
Cross	W	W	W	M	AP8781
	M	M	W	W	AP8808
	M	M	M	W	AP8809
	W	F	W	W	AP8787
	F	F	W	W	AP8795
	F	F	F	W	AP8810
	F	M	W	W	AP8811
	F	M	F	W	AP8812
	F	M	M	W	AP8813
	M	M	F	W	AP8814
	F	F	M	W	AP8815
	W	B	W	W	AP8788
	M	B	W	W	AP8816
	F	B	W	W	AP8817
	M	B	M	W	AP8818
	F	B	F	W	AP8819
F	B	M	W	AP8820	

	M	B	F	W	AP8821
	W	B	M	M	AP8822
	W	B	F	F	AP8823
	W	B	M	F	AP8824
	W	B	M	W	AP8825
	W	B	F	W	AP8826

Note: 1. F = Female 37° Flared port,
M = Male 37° Flared port,
B = Bulkhead 37° Flared male port,
W = Orbital Tube Weld port.

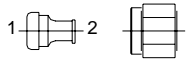
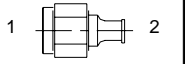
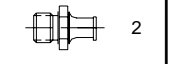
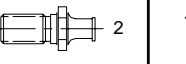
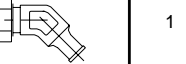
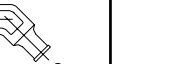
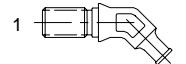
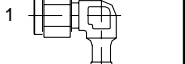


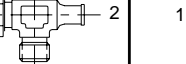
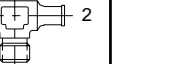
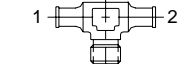
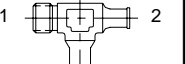
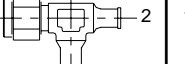
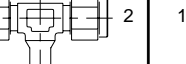
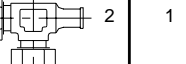
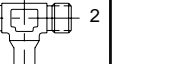
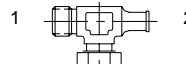
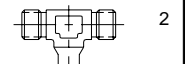
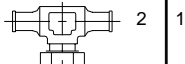
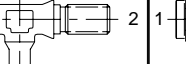
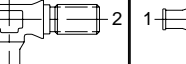
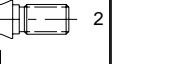
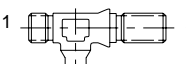
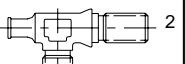


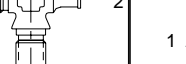
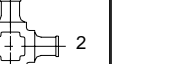
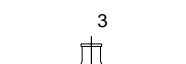
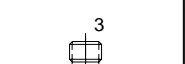
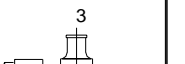




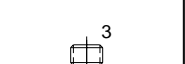
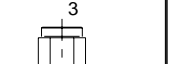









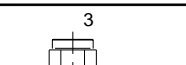
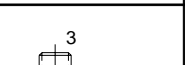
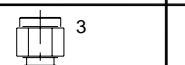
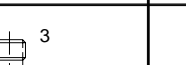
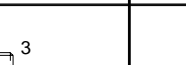

 <p>AP8129</p>	 <p>AP8135</p>	 <p>AP8102</p>	 <p>AP8379</p>	 <p>AP8360</p>	 <p>AP8362</p>
 <p>AP8340</p>	 <p>AP8380</p>	 <p>AP8328</p>	 <p>AP8578</p>	 <p>AP8617</p>	 <p>AP8564</p>
 <p>AP8610</p>	 <p>AP8618</p>	 <p>AP8641</p>	 <p>AP8604</p>	 <p>AP8642</p>	 <p>AP8605</p>
 <p>AP8611</p>	 <p>AP8643</p>	 <p>AP8644</p>	 <p>AP8645</p>	 <p>AP8646</p>	 <p>AP8555</p>
 <p>AP8607</p>	 <p>AP8789</p>	 <p>AP8827</p>	 <p>AP8828</p>	 <p>AP8790</p>	 <p>AP8829</p>
 <p>AP8830</p>	 <p>AP8831</p>	 <p>AP8832</p>	 <p>AP8833</p>	 <p>AP8834</p>	 <p>AP8835</p>
 <p>AP8791</p>	 <p>AP8836</p>	 <p>AP8837</p>	 <p>AP8838</p>	 <p>AP8839</p>	 <p>AP8840</p>
 <p>AP8841</p>	 <p>AP8842</p>	 <p>AP8843</p>	 <p>AP8844</p>	 <p>AP8845</p>	 <p>AP8846</p>

Adapters for Orbital Tube Weld to 24° Flareless Fittings

Fitting Shape	Port Sequence for Airdrome Part Number only (See example of Part No.)				Airdrome Standard	Aerospace Standard	Military Standard
	1	2	3	4			
Straight	F	W			AP8129	AS1581	MS21921
	M	W			AP8135	AS1582	
	B	W			AP8102		
45° Elbow	F	W			AP8379		
	M	W			AP8360		
	B	W			AP8362		
90° Elbow	F	W			AP8340		
	M	W			AP8380		
	B	W			AP8328		
Tee	W	M	M		AP8578		
	M	M	W		AP8617		
	M	W	W		AP8564		
	W	F	W		AP8610		
	F	F	W		AP8618		
	F	W	F		AP8641		
	F	M	W		AP8604		
	M	W	F		AP8642		
	F	W	M		AP8605		
	W	B	W		AP8611		
	F	B	W		AP8643		
	W	B	F		AP8644		
	M	B	W		AP8645		
	W	B	M		AP8646		
	W	W	M		AP8555		
W	W	F		AP8607			
Cross	M	W	W	W	AP8789		
	M	M	W	W	AP8827		
	M	M	M	W	AP8828		
	F	W	W	W	AP8790		
	F	F	W	W	AP8829		
	F	F	F	W	AP8830		
	F	M	W	W	AP8831		
	F	M	F	W	AP8832		
	F	M	M	W	AP8833		
	M	M	F	W	AP8834		
	F	F	M	W	AP8835		
	W	B	W	W	AP8791		
	M	B	W	W	AP8836		
	F	B	W	W	AP8837		
	M	B	M	W	AP8838		
F	B	F	W	AP8839			
F	B	M	W	AP8840			

	M	B	F	W	AP8841		
	W	B	M	M	AP8842		
	W	B	F	F	AP8843		
	W	B	M	F	AP8844		
	W	B	M	W	AP8845		
	W	B	F	W	AP8846		

- Note: 1. F = Female 24° Flareless port, M = Male 24° Flareless port,
B = Bulkhead 24° Flareless male port, W = Orbital Tube Weld port.
2. The AP and AS have the same configurations but are not interchangeable fittings.

 AP421	 AP6682	 AP420	 AP6671	 AP6742	 AP6725
 AP6737	 AP623	 AP6702	 AP6736	 AP6842	 AP657
 AP6801	 AP618	 AP610	 AP612	 AP6809	 AP6815
 AP6850	 AP6827	 AP620/AP625	 AP6086	 AP6087	 AP6088
 AP6089	 AP6090	 AP6091	 AP6092	 AP6093	 AP6904
 AP6923	 AP6900	 AP6901	 AP6924	 AP6925	 AP6926
 AP6927	 AP6928	 AP6929	 AP6930	 AP6910	 AP6961
 AP6931	 AP6932	 AP6933	 AP6934	 AP6935	 AP6936
 AP6937	 AP6938	 AP6939	 AP6940	 AP6941	 AP6942

Adapters for Orbital Tube Weld to Beam Seal Fittings

Fitting Shape	Port Sequence for Airdrome Part Number only (See example of Part No.)				Airdrome Standard	Aerospace Standard
	1	2	3	4		
Straight	F	W			AP421	
	F	W			AP6682	AS4227
	M	W			AP420	AS4228
	B	W			AP6671	AS4229
45° Elbow	F	W			AP6742	
	M	W			AP6725	AS4230
	B	W			AP6737	AS4231
90° Elbow	F	W			AP623	
	M	W			AP6702	AS4232
	B	W			AP6736	
Tee	F	W	M		AP6842	
	M	W	M		AP657	
	W	W	M		AP6801	
	M	W	W		AP618	
	F	W	W		AP610	
	F	F	W		AP612	
	F	W	F		AP6809	
	F	M	W		AP6815	
	M	W	F		AP6850	
	M	M	W		AP6827	
	W	W	F		AP620	
					*AP625	
	W	B	W		AP6086	
	F	B	W		AP6087	
	W	B	F		AP6088	
	M	B	W		AP6089	
	W	B	M		AP6090	
	W	W	B		AP6091	
F	W	B		AP6092		
M	W	B		AP6093		
Cross	M	W	W	W	AP6904	
	M	M	W	W	AP6923	
	M	M	M	W	AP6900	
	F	W	W	W	AP6901	
	F	F	W	W	AP6924	
	F	F	F	W	AP6925	
	F	M	W	W	AP6926	
	F	M	F	W	AP6927	
	F	M	M	W	AP6928	
	M	M	F	W	AP6929	
	F	F	M	W	AP6930	
	M	W	M	W	AP6910	
M	W	W	F	AP6961		

	W	B	W	W	AP6931	
	M	B	W	W	AP6932	
	F	B	W	W	AP6933	
	M	B	M	W	AP6934	
	F	B	F	W	AP6935	
	F	B	M	W	AP6936	
	M	B	F	W	AP6937	
	W	B	M	M	AP6938	
	W	B	F	F	AP6939	
	W	B	M	F	AP6940	
	W	B	M	W	AP6941	
	W	B	F	W	AP6942	

- Note: 1. F = Female Beam Seal port, M = Male Beam Seal port,
B = Bulkhead Beam Seal port, W = Orbital Tube Weld port.
2. * = A different part number assigned for reducers.
3. The AP and AS have the same configurations but are not interchangeable fittings.