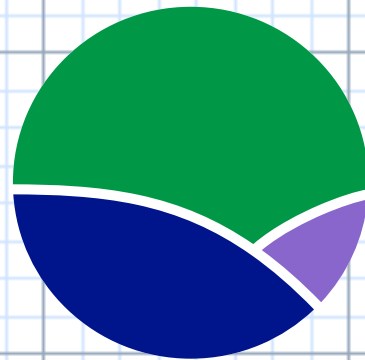


ats, inc.

Product Highlights

Duct and Pipe Systems

FM Approved
Corrosion & Fire Resistant
Exhaust Duct Systems
for use without Sprinklers



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Thank you for your interest in ATS.

ATS, Inc manufactures duct and pipe for use in industries including semiconductor fume exhaust, pharmaceutical, wastewater treatment, silicon wafer, solar cell, picture tube, flat panel production, and many others. While we offer a wide variety of products to meet your needs, we specialize in fire safe duct.

Since 1978, ATS has been known for its high performance duct, its uncompromising quality, its product innovation, and its excellent customer service and support.

Take a moment to review some of our highlights, and see why ATS is your best choice for facility exhaust.

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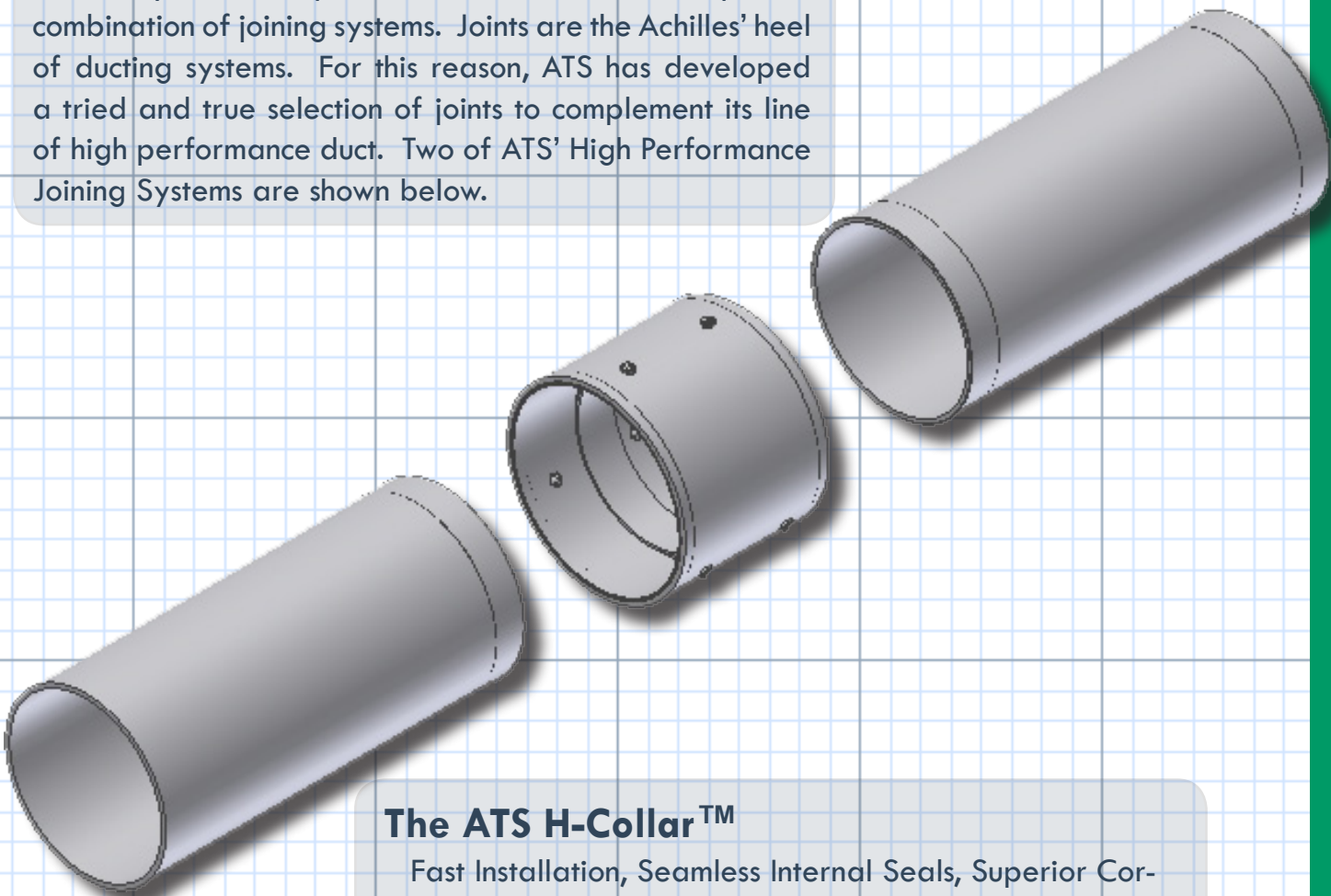
Note: All Products in this brochure are either patented or patent applied for. Copyright 2018, All Rights Reserved.

The leading edge: ATS Design

At the core of the ATS product line is a multi-laminate design technology. ATS FXP™ duct combines a corrosion resistant vinyl ester internal liner with a fire resistant phenolic exterior shell. In concert, these layers provide a duct finely tuned to the needs of the semiconductor industry. ATS StaticSafe™ duct further increases functionality with the addition of conductivity yielding an electrically stable, self-grounding duct used in pharmaceutical applications and in processes involving flammable or explosive gases. In addition to ATS FXP™ and StaticSafe™, ATS manufactures a host of other duct systems for use in industries worldwide.

Leaking Joints?

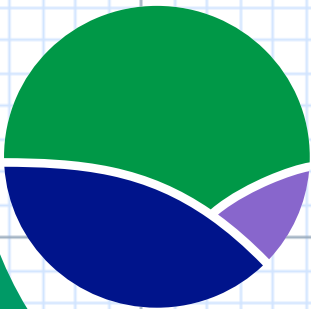
No duct system is complete without a robust and adaptable combination of joining systems. Joints are the Achilles' heel of ducting systems. For this reason, ATS has developed a tried and true selection of joints to complement its line of high performance duct. Two of ATS' High Performance Joining Systems are shown below.



The ATS H-Collar™

Fast Installation, Seamless Internal Seals, Superior Corrosion Resistance, The ATS H-Collar™, the only FM Approved and Patented FRP Exterior Collar!

- Monolithic Duct Sections that are Immune to Vibration, Corrosion, Gasket Wear, and Leakage.
- Corrosion Resistance is maintained through the joint.
- NO SANDING
- NO GASKETS
- Universal - Allows 100% on-site Modifications
- Cuts Joint Installation time by as much as 75%



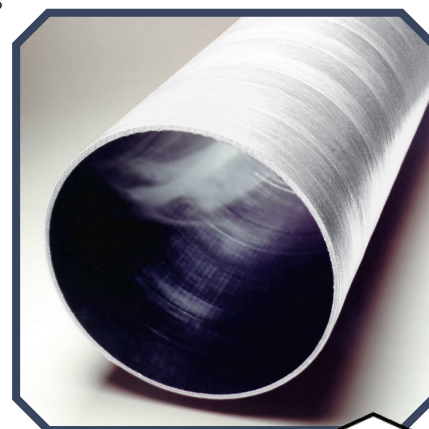
The ATS ISO Flange™

Taking ATS flexibility one step further, the ATS ISO Flange allows quick and simple disconnects.

- Disconnect duct sections for cleaning and inspections
- Retrofit current sections of duct to allow disconnects
- Flanges can be bonded on-site for contractor flexibility
- Gaskets are replaced during inspections, eliminating leaky joints as seen on other non-ATS gasketed duct systems.

Our Flagship Product: ATS FXP™

ATS FXP™ (formerly 4910CR) is a dual laminate hybrid comprised of a vinyl ester interior liner for corrosion resistance and a proprietary phenolic exterior shell for fire protection. With a proven track record in the semiconductor industry, **FXP™** gets its namesake from the Factory Mutual protocol for clean room compatibility. Designed with 100% solid seals at all jointing points, **ATS FXP™** duct system does not leak, unlike competitive products. The ATS FXP™ system - from the duct, to the joints, to the **ChemBond™** joining epoxy - is **cleanroom compatible**.


FM
APPROVED

FM 4910

FM 4922

ATS FXP™ has the following features making it an excellent choice for semiconductor and other industries:

FM 4910 Approved. With clean room materials rating, this duct system is perfect for fabs.

FM 4922 Approved. FM listed for use **without sprinklers** as well with **No Height Restrictions**.

High Corrosion Resistance. Tested in the laboratory and proven in the field through decades of facility use.

Industry leading modifiability. No other FM approved duct has the flexibility of ATS.

Light weight yet remarkably strong. State of the art manufacturing and materials produce the highest performance.

Full warranty. Industry leading support, training, inspections, and product warranties protect your investment.

Chemicals		Vinyl Ester Liner			ChemBond™		
		Conc. %	Temp °F	Temp °C	Conc. %	Temp °F	Temp °C
Ammonium Hydroxide	NH ₄ OH	29	100	38	29	120	49
Ammonium Persulfate	(NH ₄) ₂ S ₂ O ₈	ALL	100	38	ALL	100	38
Boric Acid	H ₃ BO ₃	ALL	210	99	ALL	100	38
Chlorine Gas	Cl	100	220	104	100	100	38
Chromic Acid	CrO ₃	20	150	66	20	100	38
Hydrobromic Acid	HBr	62	100	38	50	100	38
Hydrochloric Acid	HCl	37	180	82	37	100	38
Hydrofluoric Acid	HF	20	100	38	20	100	38
Hydrogen Bromide	HBr	100	180	82	100	100	38
Hydrogen Peroxide	H ₂ O ₂	30	150	66	30	100	38
Nitric Acid	HNO ₃	20	120	49	20	100	38
Ozone	O ₃	5	140	60	5	140	60
Perchloric Acid	HClO ₄	30	100	38	30	100	38
Phosphoric Acid	H ₃ PO ₄	30	100	38	30	100	38
Potassium Hydroxide	KOH	45	180	82	45	180	82
Sodium Hydroxide	NaOH	50	180	82	50	180	82
Sodium Hypochlorite	NaClO	18	180	82	18	120	49
Sulfuric Acid	H ₂ SO ₄	75	100	38	96	100	38
Toluene	C ₇ H ₈	100	80	27	100	80	27

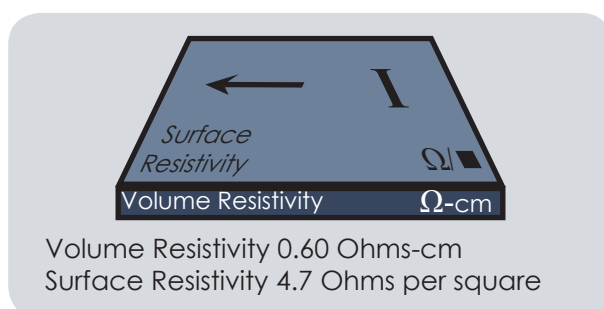
Corrosion chart for typical semiconductor processes for both the FXP™ Liner and the ChemBond™ joining epoxy.

ATS StaticSafe™

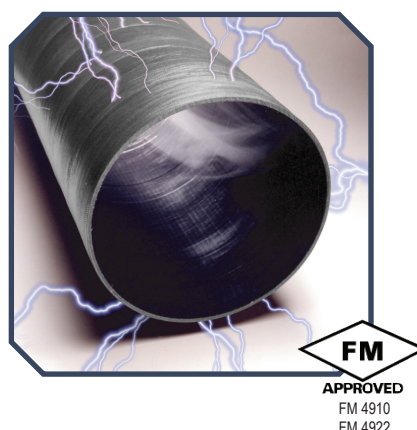
Combining the winning qualities of our FXP™ Duct with a patented conductive liner, **ATS StaticSafe™** Duct is an FM approved corrosive resistant, fire safe, **electrically stable** duct line. Not only the duct itself, but all joints, and bonding materials are custom crafted to exacting resistivity standards to create a duct system worry free from electrical discharges and voltage potentials.

Designed specifically for environments where explosive and flammable vapors are present, **StaticSafe™** is a "self grounding" line. Conductivity is preserved through the joint. Grounding leads can be installed at any point, or at the origin or termination of the line.

StaticSafe™ volume and surface resistivity:



StaticSafe™ exceeds common requirements for conductivity of 1 M $\Omega\text{-cm}$
Request the Delsen Laboratories test results.



The Original: ATS UL-181™

ATS UL-181™ Duct is designed for exhaust or high temperature air conveyance when chemical resistance needs are low but present and fire safe ducts are required. Composed of ATS' proprietary phenolic shell, applications for **ATS UL-181™** duct include mining, oil platforms, emergency purge systems and other corrosive external environments. Compatible with methylene chloride and other pharmaceutical chemicals, this duct is also UL listed as a UL181 Class 1 Air Duct.

In addition to our most popular, ATS makes other ducts for industrial and residential use:

ATS standard FRP Duct. Also employs ATS joining methods.

ATS UnderSlab™. An advancement in the field of under slab HVAC. UL181 listed.

A large array of specialty and custom fabricated ducts for your processes.

ASTM D 2996 Type 1 (Filament wound); NBS Standard PS 15-69; ASTM D 2563, Level 2 for quality

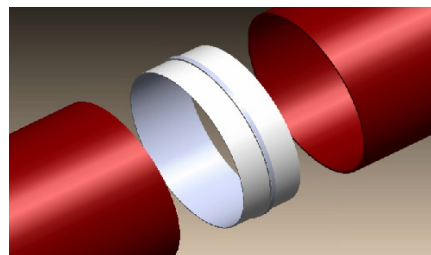


Contact ATS regarding our entire product line or visit us online at www.atsduct.com to download our full reference guide.

The ATS SlipCollar™

Redefining the fiberglass joint.

ATS SlipCollar™ is an internal Vinyl Ester Collar that when used in conjunction with **ATS ChemBond™** effectively joins two butt ends of duct securely and efficiently without leaks. An exterior fiberglass wrap adds strength and rigidity.



Self Aligning

Internal collar provides continuous corrosion barrier

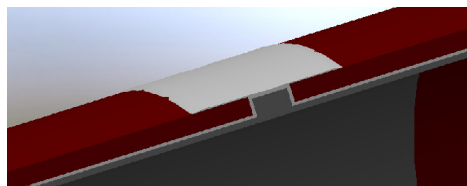
No need for sanding

Significant time savings in installation

Joints test stronger than the duct itself

No gaskets to leak, wear, or fail

By using ATS' **ChemBond™** joining resin, the joint is sealed with a "chemical weld" effectively making it leak-free.



The ATS ISO Joint™

Taking ATS flexibility one step further.

Requested by one of the nations largest semiconductor companies, ATS designed the **ATS ISO Joint™** to allow connection and tool hook-up without the use of bolts, nuts, or chemical welds. **ATS ISO Joint™** has the added capacity of allowing disassembly for cleaning and inspection, and easily reassembles.

Never before has this level of flexibility been available in an FRP duct system. Monolithic sections of duct can be constructed with any ATS joining system and assembled with ISO flanges. The solid section can then be pulled out of the system at a moment's notice. Because the gasket is replaced at the time of inspection, this joint does not suffer from leaks as do many other non-ATS gasketed duct systems.

ATS ChemBond™

Introducing **ATS ChemBond™**, the first epoxy joining system for clean rooms. **ATS ChemBond™** joints can be made in a clean room environment without harmful outgassing.

Meets and exceeds SEMI E108 standards for outgassing

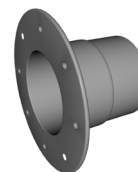
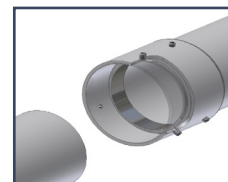
Approved for use in clean rooms by independent labs and semiconductor corporations

High Corrosion resistance (see chart under FXP™)

Bonds to multiple and dissimilar materials

Exceptionally high strength bonds

ChemBond™ ships in pre-measured bottles for ease of use



semi
BALAZS™

ATS flange built to customer spec.

A case study in ATS flexibility

The final facility design has been approved. The tools have been ordered, and the duct system is delivered and ready to install. And then it happens: the design is modified, the tools are moved, and the duct layout is significantly reconfigured; yet the installation deadline remains solid. How is it possible to meet the deadline with duct tailored to a different design? Fortunately the duct is ATS, so on-site modifications have never been easier.

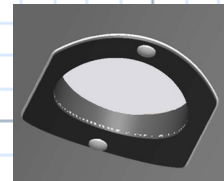
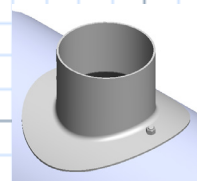
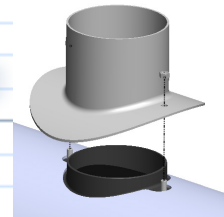
Design Freedom using ATS Tap Systems

The new innovative **ATS SlipTap™** is a new way to install lateral taps with 100% no-leak assurance, while giving the contractor the ability to install the main trunk lines prior to a finalized tool layout. Patent applied for (2011).

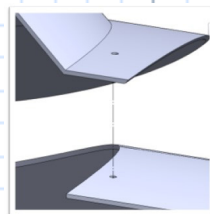
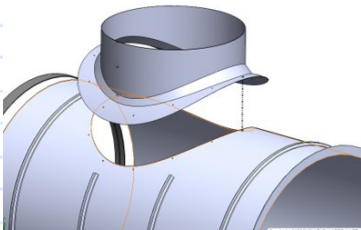
With each **ATS SlipTap™** kit comes an the external slip tap, internal tap collar, a custom hole pattern, and a bond kit. The **ATS SlipTap™** takes flexibility to a whole new level!

ATS Bolted Saddle Tap™ is a new way to install large diameter taps at the job site, especially when the overall finished main duct with tap are too large to be shipped from the factory.

Position Tap Over Collar



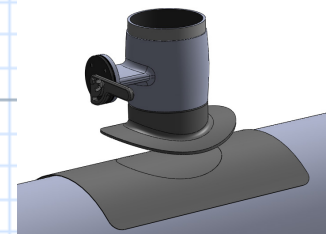
Bond & Bolt



Once the system is operational, using the **ATS HotTap™** procedure, taps can be added to the live systems without pressure loss.

The window at right shows a **HotTap™** being added to an operating system. The tap hole was cut and removed while a section of sheet metal was simultaneously slid into place. In the step shown, a saddle tap coated with **ChemBond™** is about to be put into place as the cover sheet is pulled away. A blast gate or a damper ensures that no pressure is lost from the tap end.

Design Freedom



Integrate

Every piece of ATS's material is uniformly made to accept all ATS joining systems. The figure at left shows the bonding extension in red on an ATS elbow. ATS parts, even pattern-built field fittings, can be re-configured, modified and assembled with ease, like a child's building block set!

No replacement parts need ordering, no duct is wasted, and only minimal time is spent reconfiguring the duct layout. ATS: the most reliable choice.

Request a video to see the HotTap™ procedure. ATS has a full collection of training videos and instructional literature.

Frequently Asked Questions

What are the advantages of ATS duct over lined stainless steel?

ATS is Superior to coated metal duct in the following ways: ATS ducts does not leak because all connections are sealed 100% throughout the interior and exterior; Taps can be placed after the Main lines are installed, even on a live operating system; Lower Costs; Longer Track Record of Reliability, since 1978; Longer warranty period; With the advent of **ATS ChemBond™**, ATS can be installed in clean rooms; Better service track record.

How does the cost of ATS compare on an installed basis to lined stainless steel?

ATS ducting products cost less then Coated Stainless Steel.

Does ATS offer a warranty package?

Yes. ATS' standard warranty is three (3) years, provided the duct is installed in accordance with manufacturer recommendations. However, the warranty is increased on an annual basis to five (5) years if ATS is allowed to inspect the system from start up. As ATS factories are audited annually by Factory Mutual Global, warranty only applies to components manufactured by ATS and joined in accordance with ATS recommended procedures using ATS materials. Contractor fabricated mitered elbows, taps, end caps, etc. are not covered in ATS Warranty.

What sizes of duct does ATS make?

We manufacture round duct in sizes 2"Ø (50 mm) to 160"Ø (4000 mm). ATS also makes rectangular and oval duct to meet specific design considerations. Please see our Part Type Drawings in the Mechanical Drawing Guide of the ATS Reference Guide which can be downloaded by visiting... www.atsduct.com.

Who are our customers?

The predecessor to ATS, Air Transmission Systems, sold duct to the first semiconductor company in history, Fairchild Semiconductor. Since 1978, ATS has sold duct to more then 50 industries. ATS duct was FM 4922 approved in 1981, nearly a decade before its competitors. ATS' main customer industries are: Semiconductor, Solar Wafer, Silicon and Gallium Arsenide Wafer manufacturing, Disc Drive/ memory/storage facilities, Research and Development, University, Microelectronics, Pharmaceutical, Waste water Treatment, Odor Control, and the Paper and Pulp industries.

Do you have a local representative in my area?

We have representatives throughout the United States, Singapore, and at several locations around the world. For the representative closest to you, contact the ATS Representative listed at the right.

Where can I find more information?

ATS' website, www.atsduct.com, contains considerable information, including our authoritative ATS Reference Guide and ATS installation videos. In addition see fire testing videos and other information from ATS Research, Inc. at www.atsresearch.org. ATS publishes the ATS Reference Guide which can be obtained by download by visiting www.atsduct.com, or by requesting a hard copy by contacting the ATS Factory Rep listed above.

Contact ATS:

Total Integrated Solutions Pte. Ltd.

61 Woodlands Industrial Park E9

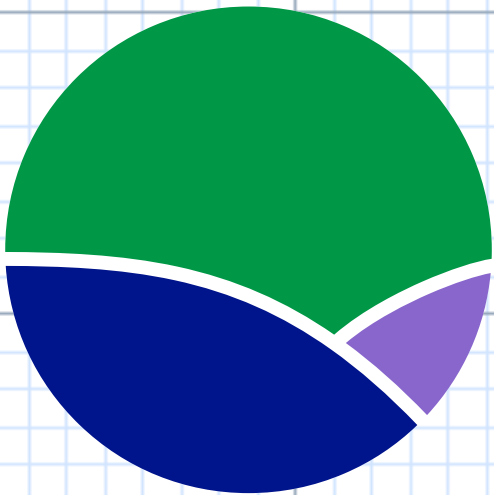
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