

Reduce Cost and Stress with
US Duct's Patented Spark Trap

**SPARK+FIRE
PROBLEMS
SOLVED!**



THE ISSUE

Sparks and embers can make their way through ductwork and create flame and explosion hazards — not good.

Fire is a real hazard within industrial settings and the manufacturing industry. According to the National Fire Protection Association (NFPA), municipal fire departments responded to an estimated average of over 4,500 structure fires per year between 2014-2018 that involved equipment associated with hot work like welding, cutting, soldering, and heat-treating equipment. That should be enough to want to take action, but here is some more food for thought:

Four out of five structure fires involving hot work occurred at properties in regular operation, with employees going about their usual activities.

Welding torches were the most common type of equipment involved in these fires, causing an estimated average of 1,650 fires and resulting in 9 deaths, 56 injuries, and \$157 million in direct property damage annually.

Cutting torches were involved in an average of 920 fires, resulting in 30 deaths and \$74 million in direct property damage annually.

An estimated 40% of businesses are unable to start up again after a significant fire.



WHAT CAN YOU DO?

Usually, you have one of two options to combat this: 1) invest in the highly-regulated and costly flame prevention and extinguishing systems, or 2) leave the protection off. Neither is an ideal situation.

Many times, protection is left off due to cost. Spark coolers are typically very expensive because few ductwork suppliers have the ability to handle both design and fabrication work in-house. As a result, collectors catch fire due to the absence of some kind of method of reducing the sparks.

The industry needs a simple and cost-effective means of reducing sparks from grinding, welding, and cutting applications to protect the workers and the existing dust collection system.

THAT'S WHERE OUR PATENTED SPARK TRAP COMES IN.



THE SUPERIOR SOLUTION

How does the US Duct Spark Trap work? It's What's on the Inside that Counts



All spark traps aren't created equal. The problem with most spark traps is they simply swirl the air.

This allows the embers to travel within the air stream at a relative velocity of zero, which is less speed than it encounters when traveling in ambient air. A spark can travel further once inside of the ductwork.

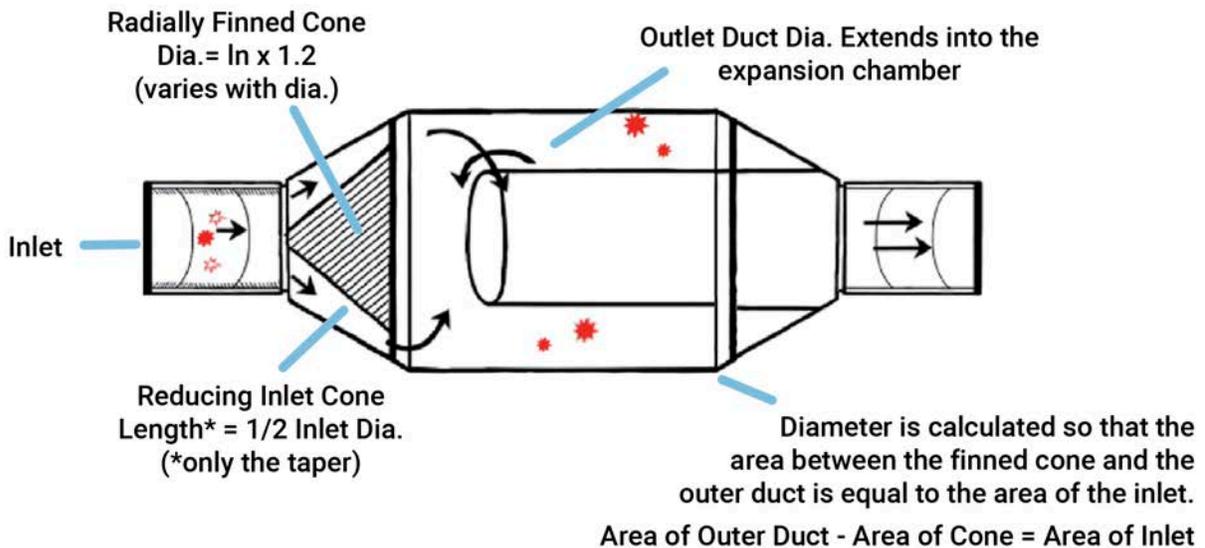
SPARKS AND MOLTEN MATERIAL, WHICH CAN REACH TEMPERATURES GREATER THAN 1,000°F, CAN EASILY TRAVEL MORE THAN 35 FEET.



Our unit does all the extinguishing in the chamber because we tumble the air, requiring it to reverse on itself twice. The extreme turbulence (what we call a tortuous path) and the time in which the spark is held in the turbulence accounts for the effectiveness of the unit.

Through the use of a vaned cone that sits in the inlet reducer, the spark-laden air is forced to the outside of the chamber while the vanes cause a simultaneous swirling action. The outlet duct is inserted into the unit so that it sits directly behind the cone.

You can mount our spark trap directly on the inlet to the collector. A number of other spark reduction options require a minimum distance from the collector. This requirement often makes it difficult to add a spark trap to an existing system and/or requires more than one trap or extinguishing point to be installed.



BECAUSE OF THE SIZING OF THE CHAMBER, AS LONG AS YOU STAY UNDER ~3,500 FPM, YOU SHOULD NOT SEE MORE THAN A 0.8" (8/10) ADDITIONAL PRESSURE DROP. THE PRESSURE GOES UP EXPONENTIALLY AFTER THAT.

Separating Heavy Debris — An Added Bonus

The retention of the spark in the spark trap unit gives potential for settling of dust within the trap in heavier dust loading applications. **All US Duct Spark Traps include clean-out doors as a standard feature.**

US Duct also fabricates a version of the spark trap with a drop-out tube. This tube is connected to the unit with a double “boot tap” to create a funnel. Any settling dust falls into the tube and then into a sealed container below the spark trap. **This has proven to be a great solution for applications such as shot-blasting, heavy grinding, and ovens because it reduces the amount of debris in the collector, saving on filter costs.**



SIZING YOUR SPARK TRAP

Improperly sized spark traps can result in significant pressure loss issues, causing the system to lose suction at its pickup points. A correctly sized spark trap will keep the velocity of the air flowing through the trap between about 3,000 feet per minute and 3,500 feet per minute, so the pressure loss of the spark trap itself is only about 0.8 inches of water column.



The two essential pieces of information you need to know to size your spark trap are:

1. Air velocity of the system
2. Trunk size of the ductwork

For example purposes, we'll imagine we're designing a ductwork system for a metal shop. The shop's airflow velocity is 4,500 cubic feet per minute, and the ductwork is 18 inches in diameter

Calculate CFM Down to 3,000 and 3,500

Using a CFM table, we can find the pipe diameter we need to get the CFM between 3,000 and 3,500.

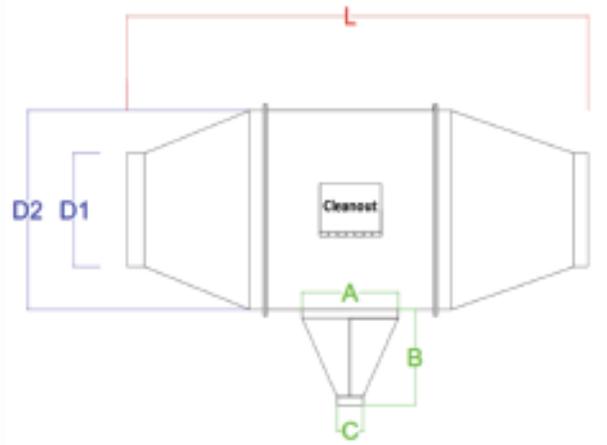
We should pick the 22-inch diameter because:

- It gets us the closest to the actual amount of air we'd be drawing through the 18-inch pipes (7,960)
- It gives you a little bit more capacity in case anything happens in the future.

RECOMMENDED VELOCITY IS 3,200 FPM - PRESSURE DROP 0.8". THE UNIT CAN BE APPLIED TO HIGHER VELOCITIES, BUT THE PRESSURE WILL JUMP EXPONENTIALLY TO ~2.8" IF RUN AT 4,500 FPM.

Get the Dimensions of Your Spark Tap

The next step is to refer to the spark trap spec sheet to find the spark trap's maximum diameter and length. The US Duct spark trap with a 22-inch inlet has an overall length of 85 inches and a maximum diameter of 40 inches.

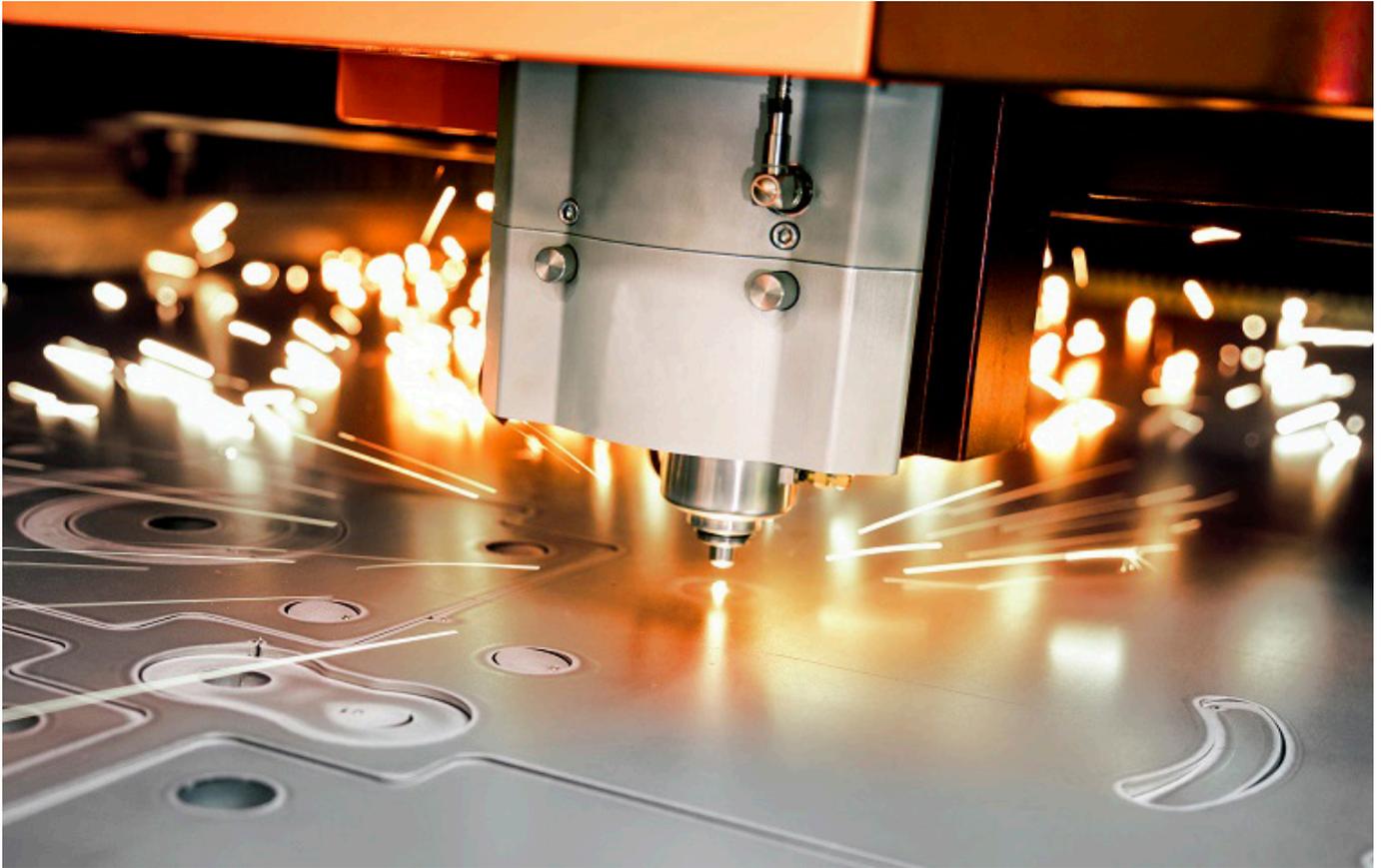


US DUCK SPARK TRAP DIMENSIONS (INCHES)						
Inlet (D1)	Outside Dia of Mid Section (D2)	Overall Length (L)	Dropout (A)	Dropout (B)	Dropout (C)	Clean-Out Door (CO)
4	8	36	4	8	4	6x8
5	9	40	5	8	4	6x8
6	11	45	6	8	4	8x10
7	12	41	7	8	4	8x10
8	14	46	8	8	4	8x10
9	16	48	9	8	4	8x10
10	18	51	10	8	4	8x10
12	22	59	12	8	4	10x12
14	25	66	14	14	6	10x12
16	29	70	16	14	6	10x12
18	33	78	18	14	6	12x14
20	36	81	20	14	6	12x14
22	40	85	22	14	6	12x14
24	44	96	24	14	6	12x14
26	46	102	24	18	6	12x14
28	50	110	24	18	6	12x14
30	54	114	24	18	6	12x14
32	58	121	24	18	6	12x14
34	62	131	24	18	6	12x14
36	66	137	24	18	6	12x14
38	70	155	24	18	6	12x14
40	72	159	24	18	6	12x14
42	76	163	24	18	6	12x14
44	80	167	24	18	6	12x14
46	84	184	24	18	6	12x14
48	88	188	24	18	6	12x14

NEED HELP SIZING YOUR SPARK TRAP? CALL A DUCT GUY... OR GAL.



REAL LIFE SPARK TRAP PROBLEMS – SOLVED!



THE PROBLEM

Exhaust from a Laser Cutting Table

Engineered Air Systems contacted US Duct in need of an industrial duct system for a client in the metal equipment manufacturing industry. **The client was looking for a reliable and affordable way to reduce the spark and fire hazard of exhaust from a laser cutting table.**

THE SOLUTION

Based on the location, application, and size of the duct (14") needed, US Duct recommended a custom-designed US Duct system including a patented Spark Trap (with a grit drop-out trap) placed inline between the cutting table and a GreCon fire protection system. Working with Engineered Air Systems, the US Duct team drew up and sized the proposed design, then worked with the dealer and client to make modifications to ensure the best possible performance. **The result is a simple, affordable solution that reduces spark and particulates in the ductwork prior to engaging the GreCon system.**



THE PROBLEM

Contaminate from a Shot-Blasting Facility

Shot-blasting is a widely used method of cleaning and strengthening metal by spraying abrasives onto a component at an extremely high velocity. The process creates significant particulates, both from the abrasive being used as well as the blasted material. Since shot-blasting is used across many industries and in various applications, **many shot-blasting facilities deal with contaminants that may be toxic, corrosive, or explosive in nature.**

THE SOLUTION

A properly designed and implemented dust collection system for shot-blasting facilities is therefore critical in order to maintain a safe environment and high-quality production. The client had concerns that **their existing spark trap was not designed properly.** After talking with our design team and watching the video of the spark trap in action, they decided to add US Duct's patented spark trap to their system for security.

After implementation, the client's new equipment can operate at full capacity. A new dust collection and spark trap safely captures environmental contaminants and reduces explosion risk.

BUILDING YOUR INDUSTRIAL DUCTWORK SYSTEM

Whether it's an existing or new system, spark traps are just one piece of the ductwork puzzle. And when it comes to ductwork design, application is everything. The material you need to convey and the environment in which your ductwork is installed will determine what the ductwork is made of and the ductwork's fit. A good vendor will give you access to knowledgeable reps—not just order-takers who assume you know what you need or sales reps that only want to close the deal. The person you are working with should ask about the application and make recommendations on the right type of ductwork.

TO BE ABLE TO SUPPLY THE RIGHT DUCTWORK, YOUR VENDOR SHOULD ASK QUESTIONS LIKE:

- What will the ductwork convey?
- What's the environment like in the facility?
- Are there mandatory specifications, or ranges?
- What challenges are unique to this installation?





Application knowledge is indispensable when you bid on projects or encounter a new industry — especially if there are inherent hazards like sparks.

A ductwork vendor should have the experience and expertise to make the right recommendations for your application, like:

- A properly designed hood so as to effectively use the available air to capture the greatest amount of dust.
- Correctly sized ductwork to keep the air moving at the correct velocity and prevent the material from settling out and further obstructing the flow.
- Balancing apparatus (gates, butterflies, etc.) to help direct and control the airflow beyond what sizing the duct can do.
- Special parts that help remove excess fluid in oil mist applications and sparks from welding/cutting applications.
- Additional safety features such as backblast dampers and spark detection/suppression to protect against explosions and subsequent impact.



US DUCT'S PATENTED SPARK TRAP

While no industrial spark arrestor or trap, including US Duct's, can guarantee 100% extinguishing, our goal is to provide reduction and limit risk.*

As a design group and experienced sheet metal fabricator, US Duct can provide spark traps of the highest quality at a price that most ductwork suppliers cannot match. By combining our understanding of dust collection and air dynamics with our in-house fabrication, US Duct retains build and performance quality while simultaneously passing along the price savings to our customers. **The result is a patented spark trap that works and is highly cost-effective.**

*US Duct's spark trap is not for use in environments requiring fail-safe performance.





US Duct is an American-owned and operated, industry-leading manufacturer and supplier of industrial ductwork systems and custom solutions.

The combination of a dedicated sales team and skilled fabricators gives contractors, ductwork installers, and OEM representatives everything needed to select and sell ductwork to end-users. US Duct has extensive knowledge of ductwork applications, design, and manufacturing that allows us to offer comprehensive lines of clamp-together ductwork, airtight tubing, flanged ductwork, and special solution products.

From take-off design services to on-time delivery to installation, we will provide the support you need for any project. We know that when you succeed, we succeed. That's why we're committed to developing long-term partnerships that save you time, money, and the stress of selling ductwork. And you may even have a little bit of fun along the way.

CONTACT A DUCT GUY TO SEE HOW US DUCT CAN MAKE DUCTWORK EASY FOR YOU.

