

distributed hash research

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FEATURING:
 **CRYPTO
CLOAKS**
WYOMING 2022

The Effect of ASIC Exhaust 'Mining Pants'

distributed hash research is dedicated to studying the mining ecosystem and producing content that empowers miners of all sizes and experience levels. For project consultation, hosting, or general inquiries, please email hosting@distributedha.sh

The bitcoin mining industry is astonishingly early in ancillary product development. Looking beyond the particular machine a Bitcoin miner is running and deeper into the setting and format of a mining operation will yield an absence of commercialized products. Managing heat, sound, electricity, and airflow in a mining operation are typically done by re-applying various existing commercial products, not by building entirely new things.

Novel products are few and far between in the bitcoin mining space, which is why CryptoCloaks Exhaust Shrouds (AKA 'Mining Pants') pose a unique opportunity to study their application in a commercial mining environment.

The following research brief aims to introduce early data on the effects of mounting 12 sets of Exhaust Shrouds on both Antminer and Whatsminer Machines of various terahash ratings.

Our early data suggests that installing CryptoCloaks Exhaust Shrouds with 8in exhaust ports on both Whatsminer and Antminer machines, secured to an airtight pressure barrier, produces an increase in nominal hash between, 1.28% and 16.70%. Early data suggests the use of exhaust shrouds may provide a protective effect on machine PSUs (especially degraded machines) due to their unique aerodynamic properties. Additionally, the use of exhaust shrouds provides an opportunity to build datacenters with uniform sized exhaust holes, thus future-proofing against building and labor costs associated with upgrades.

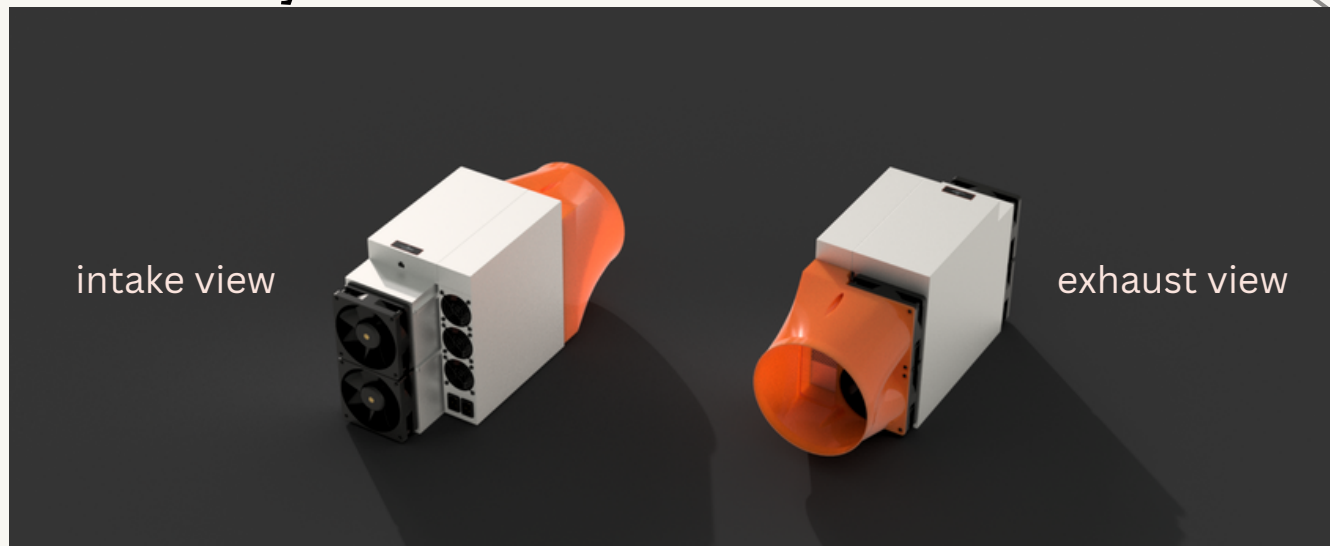
Our immediate recommendation is that miners building in environments where marginal efficiency gains, maximal cooling, or the ability to swap machines quickly is important, consider implementing the use of exhaust shrouds as standard practice.

Notes on Miner Data and Business Relationship:

The following data were collected in a dry, Western environment at an altitude over 4,000ft, but below the manufacturer recommended maximum operating altitude of 6,561ft (2000m) for most new generation miners. Data was collected via a mounted weather station and API query in a single air-cooled datacenter across multiple weeks in mid to late September. Temperature conditions varied between a high of 86F (30C) midday and 0F (-17.7C) in the evenings. Precipitation was 6.09mm over the period of data collection with humidity between 100% and 10% (average 50%) and wind conditions between 0 mph and 30 mph.

distributed hash has established a business relationship with CryptoCloaks in Bitcoin miner product development and testing. When you purchase anything discussed herein, you help CryptoCloaks and distributed hash continue to build and research miner product development.

The Utility of ASIC Miner Exhaust Shrouds



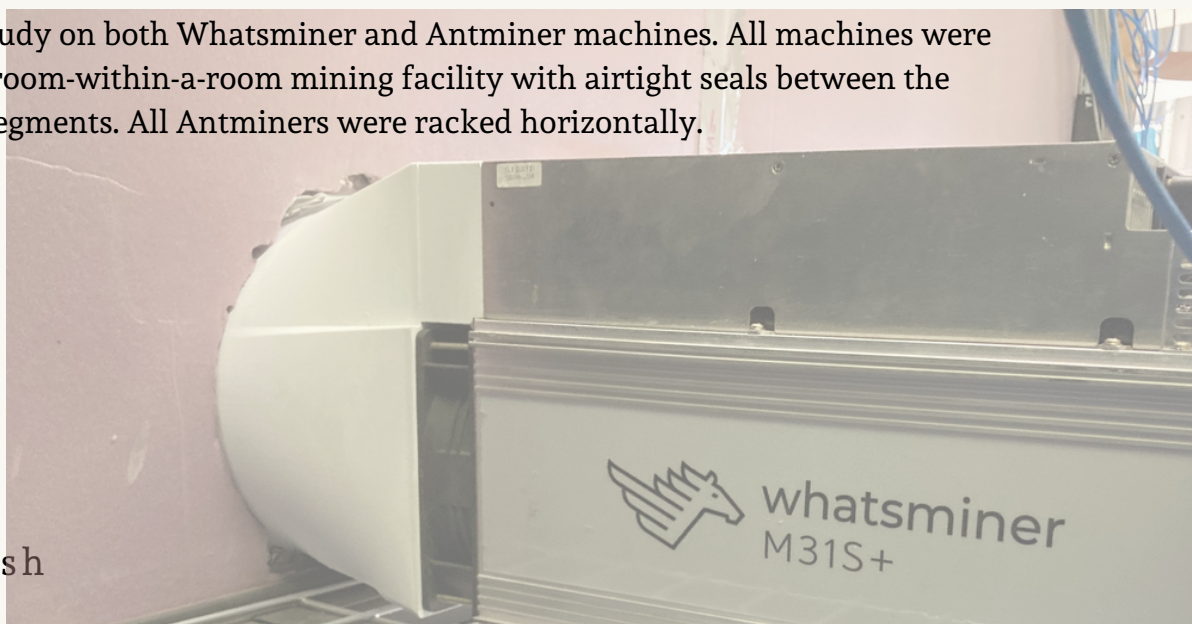
ASIC Miner exhaust shrouds have emerged in the mining market as a functional way for home miners to, more directly route inbound and exhaust airflow, utilize otherwise waste exhaust heat, and operate your ASIC near silently with the removal of stock fans and their replacement with inline fans.

These innovations have been led primarily by the pleb home miners and tinkerers in this space. We have found no public research into the effects of these shrouds when utilized at a prosumer or commercial scale.

NOTE: As we present preliminary findings below, please note we are finalizing and will soon announce an upcoming pilot project with a large publicly traded miner that will increase our dataset by an order of magnitude. More thorough data is incoming.

This preliminary research aims to explore the potential effects of using exhaust shrouds in a commercial sized mining facility.

We conducted this study on both Whatsminer and Antminer machines. All machines were racked in our 1MW, room-within-a-room mining facility with airtight seals between the intake and exhaust segments. All Antminers were racked horizontally.



Shroud Effects and Potential Mechanisms

The below '7-Day Avg Hash' chart details our preliminary findings in both Whatsminer and Antminer machines both pre- and during-shroud installation across a multi-week testing period.

Note that we run Braiins on all Antminer machines in our facility for improved tuning and efficiency monitoring, *however*, our preliminary findings indicate that



shroud effect is not contingent on a particular firmware suite. Interestingly, the shrouds provide meaningful increases in nominal hash across multiple models of ASIC. Because of the particular shroud design, which exhausts both the PSU and main cooling fans into the same channel, we hypothesize that this attachment allows all unit fans to work together with greater overall efficiency.

This provisional hypothesis is supported by the data from an underperforming M31S 76Th in the dataset below. After installation of the shroud, hash jumped 16.70%, nominally over the rated machine performance. This suggests a compensatory effect occurring between the main and PSU fans, increasing machine robustness via additional PSU cooling.

		7-Day Avg Hash		
	Miner	Pre-Shroud	Post-Shroud	% Increase
M30S++	106Th	110.58	112	1.28
M30S	88Th	88.72	91.46	3.09
M30S+	78Th	83.58	85.28	2.03
S19 J Pro	104Th Braiins	106.54	109.68	2.95
S19 J Pro	100Th Braiins	103.38	107.67	4.15
S19 J Pro	92Th Braiins	104.1	107.93	3.68
M31S	76Th **	68.75	80.23	16.70

**** This machine has a defect in that the exhaust fan only operates at 500rpm**

Discussion and Next Steps:

This provisional research brief has begun the study of using aftermarket ASIC performance parts to increase machine output and stability. **Our early findings suggest that CryptoCloaks Exhaust Shrouds allow for greater nominal machine performance, regardless of ASIC type or machine firmware (Antminer or Whatsminer, Braiins or Stock).**

Most interesting is the potential for Exhaust Shrouds to stabilize the performance of derated machines, as is the case of the M31S 76Th in our dataset. This extreme performance enhancement suggests that the shape of the Exhaust Shroud allows PSU and main chip fans to work together symbiotically for greater efficiency. If these data are validated at a larger scale, there are implications in using Exhaust Shrouds for machine lifecycle enhancement and overall fan durability.

There are also several implications with the use of Exhaust Shrouds in large commercial farms. Airflow and heat management are some of the most difficult issues commercial miners mitigate, and any way to operate marginally more efficiently makes a big difference at the end of the quarter. The ability to 'repair' underperforming miners (that is until parts can be replaced), and to increase overall facility output by 1.28% to 4.15% across various machine types, is meaningful when a company is running 10,000+ machines. Furthermore, standardization of exhaust sizes (8 inches in our case) allows facilities to build hot/cold aisles once, and not incur additional construction and labor costs as they upgrade machine types with differing dimensions, or switch ASIC manufacturers altogether. This also has implications for containerized mining solution manufacturers.

As is often the case with Bitcoin, plebs will find and utilize solutions long before commercial interests discover them. We are happy to conduct this preliminary study and validate much of the existing cult knowledge around CryptoCloaks exhaust shrouds. Currently, we are planning a larger scale pilot that will allow us greater insight and validation into the performance qualities of the CryptoCloaks Exhaust Shrouds (Mining Pants).

As a thank you to the plebs that build, we are also happy to offer a 5% discount on any CryptoCloaks shrouds (Found here: <https://www.cryptocloaks.com/product-category/mining/>) with the use of the code 'distributedhash'

Knowledge is power.

-distributed hash team