



# VesperToken Smart Contract Audit Report

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# AUDITED DETAILS

## Audited Project

Project name	Token ticker	Blockchain
VesperToken	VSP	Ethereum

## Addresses

Contract address	0x1b40183efb4dd766f11bda7a7c3ad8982e998421
Contract deployer address	0xB5AbDABE50b5193d4dB92a16011792B22bA3Ef51

## Project Website

<a href="https://vesper.finance/">https://vesper.finance/</a>
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## Codebase

<a href="https://etherscan.io/address/0x1b40183efb4dd766f11bda7a7c3ad8982e998421#code">https://etherscan.io/address/0x1b40183efb4dd766f11bda7a7c3ad8982e998421#code</a>
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# SUMMARY

Vesper is a platform of DeFi products designed for ease-of-use, longevity, and scale. It is a comprehensive ecosystem governed by the VSP token.

## Contract Summary

### Documentation Quality

VesperToken provides a very poor documentation with standard of solidity base code.

- The technical description is provided unclear and disorganized.

### Code Quality

The Overall quality of the basecode is poor.

- Solidity basecode and rules are unclear and disorganized by VesperToken.

### Test Coverage

Test coverage of the project is 100% ( Through Codebase )

## Audit Findings Summary

- SWC-101 | It is recommended to use vetted safe math libraries for arithmetic operations consistently on lines 1081.
- SWC-103 | Pragma statements can be allowed to float when a contract is intended on lines 9, 142, 222, 384 and 528.
- SWC-120 | It is recommended to use external sources of randomness via oracles on lines 961 and 1035.

## CONCLUSION

We have audited the VesperToken project released in February 2021 to find issues and identify potential security vulnerabilities in the VesperToken project. This process is used to find technical issues and security loopholes that may be found in smart contracts.

The security audit report gave unsatisfactory results with the discovery of high-risk issues and several other low-risk issues.

Writing a contract that does not follow the Solidity style guide can pose a significant risk. The high risk problem we found is the arithmetic operator can overflow, and It is possible to cause an integer overflow in the arithmetic operation. Whereas Low risk Issues we found are floating pragmas set on several lines and the use of "block.number" environment as a source of randomness. Note that the values of variables like coinbase, gaslimit, block number and timestamp are predictable and can be manipulated by a malicious miner. Also, keep in mind that attackers know hashes of earlier blocks. Avoid using any of those environment variables as sources of randomness and be aware that use of these variables introduces a certain level of trust into miners.

# AUDIT RESULT

Article	Category	Description	Result
Default Visibility	SWC-100 SWC-108	Functions and state variables visibility should be set explicitly. Visibility levels should be specified consciously.	PASS
Integer Overflow and Underflow	SWC-101	If unchecked math is used, all math operations should be safe from overflows and underflows.	ISSUE FOUND
Outdated Compiler Version	SWC-102	It is recommended to use a recent version of the Solidity compiler.	PASS
Floating Pragma	SWC-103	Contracts should be deployed with the same compiler version and flags that they have been tested thoroughly.	ISSUE FOUND
Unchecked Call Return Value	SWC-104	The return value of a message call should be checked.	PASS
Unprotected Ether Withdrawal	SWC-105	Due to missing or insufficient access controls, malicious parties can withdraw from the contract.	PASS
SELFDESTRUCT Instruction	SWC-106	The contract should not be self-destructible while it has funds belonging to users.	PASS
Reentrancy	SWC-107	Check effect interaction pattern should be followed if the code performs recursive call.	PASS
Uninitialized Storage Pointer	SWC-109	Uninitialized local storage variables can point to unexpected storage locations in the contract.	PASS
Assert Violation	SWC-110 SWC-123	Properly functioning code should never reach a failing assert statement.	PASS
Deprecated Solidity Functions	SWC-111	Deprecated built-in functions should never be used.	PASS
Delegate call to Untrusted Callee	SWC-112	Delegatecalls should only be allowed to trusted addresses.	PASS

DoS (Denial of Service)	SWC-113 SWC-128	Execution of the code should never be blocked by a specific contract state unless required.	PASS
Race Conditions	SWC-114	Race Conditions and Transactions Order Dependency should not be possible.	PASS
Authorization through tx.origin	SWC-115	tx.origin should not be used for authorization.	PASS
Block values as a proxy for time	SWC-116	Block numbers should not be used for time calculations.	PASS
Signature Unique ID	SWC-117 SWC-121 SWC-122	Signed messages should always have a unique id. A transaction hash should not be used as a unique id.	PASS
Incorrect Constructor Name	SWC-118	Constructors are special functions that are called only once during the contract creation.	PASS
Shadowing State Variable	SWC-119	State variables should not be shadowed.	PASS
Weak Sources of Randomness	SWC-120	Random values should never be generated from Chain Attributes or be predictable.	ISSUE FOUND
Write to Arbitrary Storage Location	SWC-124	The contract is responsible for ensuring that only authorized user or contract accounts may write to sensitive storage locations.	PASS
Incorrect Inheritance Order	SWC-125	When inheriting multiple contracts, especially if they have identical functions, a developer should carefully specify inheritance in the correct order. The rule of thumb is to inherit contracts from more /general/ to more /specific/.	PASS
Insufficient Gas Griefing	SWC-126	Insufficient gas grieving attacks can be performed on contracts which accept data and use it in a sub-call on another contract.	PASS
Arbitrary Jump Function	SWC-127	As Solidity doesnt support pointer arithmetics, it is impossible to change such variable to an arbitrary value.	PASS

Typographical Error	SWC-129	A typographical error can occur for example when the intent of a defined operation is to sum a number to a variable.	PASS
Override control character	SWC-130	Malicious actors can use the Right-To-Left-Override unicode character to force RTL text rendering and confuse users as to the real intent of a contract.	PASS
Unused variables	SWC-131 SWC-135	Unused variables are allowed in Solidity and they do not pose a direct security issue.	PASS
Unexpected Ether balance	SWC-132	Contracts can behave erroneously when they strictly assume a specific Ether balance.	PASS
Hash Collisions Variable	SWC-133	Using abi.encodePacked() with multiple variable length arguments can, in certain situations, lead to a hash collision.	PASS
Hardcoded gas amount	SWC-134	The transfer() and send() functions forward a fixed amount of 2300 gas.	PASS
Unencrypted Private Data	SWC-136	It is a common misconception that private type variables cannot be read.	PASS



# SMART CONTRACT ANALYSIS

Started	Thursday Feb 11 2021 08:44:24 GMT+0000 (Coordinated Universal Time)
Finished	Friday Feb 12 2021 17:37:56 GMT+0000 (Coordinated Universal Time)
Mode	Standard
Main Source File	VSP.sol

## Detected Issues

ID	Title	Severity	Status
SWC-101	THE ARITHMETIC OPERATOR CAN OVERFLOW.	high	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
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SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-120	POTENTIAL USE OF "BLOCK.NUMBER" AS SOURCE OF RANDOMNESS.	low	acknowledged
SWC-120	POTENTIAL USE OF "BLOCK.NUMBER" AS SOURCE OF RANDOMNESS.	low	acknowledged

# SWC-101 | THE ARITHMETIC OPERATOR CAN OVERFLOW.

LINE 1081

## high SEVERITY

It is possible to cause an integer overflow or underflow in the arithmetic operation.

## Source File

- VSP.sol

## Locations

```
1080     constructor() public VSPGovernanceToken("VesperToken", "VSP") {  
1081         mintLockPeriod = block.timestamp + (365 days);  
1082     }  
1083  
1084     /// @dev Mint VSP. Only owner can mint  
1085
```

## SWC-103 | A FLOATING PRAGMA IS SET.

LINE 9

### low SEVERITY

The current pragma Solidity directive is ""^0.6.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

### Source File

- VSP.sol

### Locations

```
8
9  pragma solidity ^0.6.0;
10
11  /*
12   * @dev Provides information about the current execution context, including the
13
```

## SWC-103 | A FLOATING PRAGMA IS SET.

LINE 142

### low SEVERITY

The current pragma Solidity directive is ""^0.6.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

### Source File

- VSP.sol

### Locations

```
141
142  pragma solidity ^0.6.0;
143
144  /**
145   * @dev Interface of the ERC20 standard as defined in the EIP.
146
```

## SWC-103 | A FLOATING PRAGMA IS SET.

LINE 222

### low SEVERITY

The current pragma Solidity directive is `""^0.6.0""`. It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

### Source File

- VSP.sol

### Locations

```
221
222  pragma solidity ^0.6.0;
223
224  /**
225   * @dev Wrappers over Solidity's arithmetic operations with added overflow
226
```

## SWC-103 | A FLOATING PRAGMA IS SET.

LINE 384

### low SEVERITY

The current pragma Solidity directive is `""^0.6.2""`. It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

### Source File

- VSP.sol

### Locations

```
383
384  pragma solidity ^0.6.2;
385
386  /**
387   * @dev Collection of functions related to the address type
388
```

## SWC-103 | A FLOATING PRAGMA IS SET.

LINE 528

### low SEVERITY

The current pragma Solidity directive is `""^0.6.0""`. It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

### Source File

- VSP.sol

### Locations

```
527
528  pragma solidity ^0.6.0;
529
530
531
532
```

## SWC-120 | POTENTIAL USE OF "BLOCK.NUMBER" AS SOURCE OF RANDOMNESS.

LINE 961

### low SEVERITY

The environment variable "block.number" looks like it might be used as a source of randomness. Note that the values of variables like coinbase, gaslimit, block number and timestamp are predictable and can be manipulated by a malicious miner. Also keep in mind that attackers know hashes of earlier blocks. Don't use any of those environment variables as sources of randomness and be aware that use of these variables introduces a certain level of trust into miners.

### Source File

- VSP.sol

### Locations

```
960 function getPriorVotes(address account, uint256 blockNumber) external view returns
(uint256) {
961     require(blockNumber < block.number, "VSP::getPriorVotes: not yet determined");
962
963     uint32 nCheckpoints = numCheckpoints[account];
964     if (nCheckpoints == 0) {
965
```



## SWC-120 | POTENTIAL USE OF "BLOCK.NUMBER" AS SOURCE OF RANDOMNESS.

LINE 1035

### low SEVERITY

The environment variable "block.number" looks like it might be used as a source of randomness. Note that the values of variables like coinbase, gaslimit, block number and timestamp are predictable and can be manipulated by a malicious miner. Also keep in mind that attackers know hashes of earlier blocks. Don't use any of those environment variables as sources of randomness and be aware that use of these variables introduces a certain level of trust into miners.

### Source File

- VSP.sol

### Locations

```
1034     uint32 blockNumber =
1035     safe32(block.number, "VSP::_writeCheckpoint: block number exceeds 32 bits");
1036
1037     if (nCheckpoints > 0 && checkpoints[delegatee][nCheckpoints - 1].fromBlock ==
blockNumber) {
1038         checkpoints[delegatee][nCheckpoints - 1].votes = newVotes;
1039     }
```

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This is a limited report on our findings based on our analysis, in accordance with good industry practice as of the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the below disclaimer below – please make sure to read it in full.

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