



MISRA-C 2004 GUIDELINES FOR THE USE OF THE C LANGUAGE IN CRITICAL SYSTEMS | CODESONAR® 7.2



TRUSTED LEADERS OF SOFTWARE ASSURANCE AND ADVANCED CYBER-SECURITY SOLUTIONS

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INTRODUCTION

The MISRA C:2004 standard aims to foster safety, reliability, and portability of programs written in ISO C for embedded systems. It is used in a wide range of industries, including automotive, aero-space, medical devices, and industrial control.

CodeSonar 7.2 includes a large number of warning classes that support checking for the MISRA C:2004 guidelines. Every CodeSonar warning report includes the numbers of any MISRA C:2004 rules that are closely mapped to the warning's class. (The close mapping for a warning class is the set of categories—including MISRA C:2004 rule and directive numbers—that most closely match the class, if any).

You can configure CodeSonar to enable and disable warning classes mapped to specific MISRA C:2004 rules, or use build presets to enable all warning classes that are closely mapped to any MISRA C:2004 rules and directives. In addition, you can use the CodeSonar search function to find warnings related to specific MISRA C:2004 rules, or to any MISRA C:2004 rule.

For more information on MISRA C:

<https://www.misra.org.uk/MISRAHome/tabid/181/Default.aspx>



MISRA C:2004 CLOSE MAPPING (CODESONAR V7.2)

The following table contains CodeSonar classes that are closely mapped to specific MISRA C:2004 rules and directives.

Rule	Rule Name	Category	Supported
Misra2004:1.1	All code shall conform to ISO/IEC 9899:1990 "Programming languages C", amended and corrected by ISO/IEC 9899/COR1:1995, ISO/IEC 9899/AMD1:1995, and ISO/IEC 9899/COR2:1996	Required	Yes
Misra2004:1.2	No reliance shall be placed on undefined or unspecified behaviour	Required	No
Misra2004:1.3	Multiple compilers and/or languages shall only be used if there is a common defined interface standard for object code to which the languages/compiler/assemblers conform	Required	No
Misra2004:1.4	The compiler/linker shall be checked to ensure that 31 character significance and case sensitivity are supported for external identifiers	Required	No
Misra2004:1.5	Floating-point implementations should comply with a defined floating-point standard	Advisory	No
Misra2004:2.1	Assembly language shall be encapsulated and isolated	Required	Yes
Misra2004:2.2	Source code shall only use /* ... */ style comments	Required	Yes
Misra2004:2.3	The character sequence /* shall not be used within a comment	Required	Yes
Misra2004:2.4	Sections of code should not be "commented out"	Advisory	Yes
Misra2004:3.1	All usage of implementation-defined behaviour shall be documented	Required	No
Misra2004:3.2	The character set and the corresponding encoding shall be documented	Required	No
Misra2004:3.3	The implementation of integer division in the chosen compiler should be determined, documented and taken into account	Advisory	No
Misra2004:3.4	All uses of the #pragma directive shall be documented and explained	Required	No
Misra2004:3.5	The implementation defined behaviour and packing of bitfields shall be documented if being relied upon	Required	No
Misra2004:3.6	All libraries used in production code shall be written to comply with the provisions of this document, and shall have been subject to appropriate validation	Required	No
Misra2004:4.1	Only those escape sequences that are defined in the ISO C standard shall be used	Required	No
Misra2004:4.2	Trigraphs shall not be used	Required	Yes
Misra2004:5.1	Identifiers (internal and external) shall not rely on the significance of more than 31 characters	Required	Yes
Misra2004:5.2	Identifiers in an inner scope shall not use the same name as an identifier in an outer scope, and therefore hide that identifier	Required	Yes
Misra2004:5.3	A typedef name shall be a unique identifier	Required	Yes
Misra2004:5.4	A tag name shall be a unique identifier	Required	Yes
Misra2004:5.5	No object or function identifier with static storage duration should be reused	Advisory	Yes
Misra2004:5.6	No identifier in one name space should have the same spelling as an identifier in another name space, with the exception of structure member and union member names	Advisory	No
Misra2004:5.7	No identifier name should be reused	Advisory	Yes
Misra2004:6.1	The plain char type shall be used only for storage and use of character values	Required	Yes
Misra2004:6.2	signed and unsigned char type shall be used only for the storage and use of numeric values	Required	Yes
Misra2004:6.3	typedefs that indicate size and signedness should be used in place of the basic numerical types	Advisory	Yes
Misra2004:6.4	Bit fields shall only be defined to be of type unsigned int or signed int	Required	Yes
Misra2004:6.5	Bit fields of signed type shall be at least 2 bits long	Required	Yes
Misra2004:7.1	Octal constants (other than zero) and octal escape sequences shall not be used	Required	Yes
Misra2004:8.1	Functions shall have prototype declarations and the prototype shall be visible at both the function definition and call	Required	Yes
Misra2004:8.2	Whenever an object or function is declared or defined, its type shall be explicitly stated	Required	No



Misra2004:8.3	For each function parameter the type given in the declaration and definition shall be identical, and the return types shall also be identical	Required	Yes
Misra2004:8.4	If objects or functions are declared more than once their types shall be compatible	Required	Yes
Misra2004:8.5	There shall be no definitions of objects or functions in a header file	Required	Yes
Misra2004:8.6	Functions shall be declared at file scope	Required	Yes
Misra2004:8.7	Objects shall be defined at block scope if they are only accessed from within a single function	Required	Yes
Misra2004:8.8	An external object or function shall be declared in one and only one file	Required	Yes
Misra2004:8.9	An identifier with external linkage shall have exactly one external definition	Required	Yes
Misra2004:8.10	All declarations and definitions of objects or functions at file scope shall have internal linkage unless external linkage is required	Required	Yes
Misra2004:8.11	The static storage class specifier shall be used in definitions and declarations of objects and functions that have internal linkage	Required	Yes
Misra2004:8.12	When an array is declared with external linkage, its size shall be stated explicitly or defined implicitly by initialisation	Required	Yes
Misra2004:9.1	All automatic variables shall have been assigned a value before being used	Required	Yes
Misra2004:9.2	Braces shall be used to indicate and match the structure in the non-zero initialisation of arrays and structures	Required	Yes
Misra2004:9.3	In an enumerator list, the "=" construct shall not be used to explicitly initialise members other than the first, unless all items are explicitly initialised	Required	Yes
Misra2004:10.1	The value of an expression of integer type shall not be implicitly converted to a different underlying type if: (a) it is not a conversion to a wider integer type of the same signedness, or (b) the expression is complex, or (c) the expression is not constant and is a function argument, or (d) the expression is not constant and is a return expression	Required	Yes
Misra2004:10.2	The value of an expression of floating type shall not be implicitly converted to a different type if: (a) it is not a conversion to a wider floating type, or (b) the expression is complex, or (c) the expression is a function argument, or (d) the expression is a return expression	Required	Yes
Misra2004:10.3	The value of a complex expression of integer type shall only be cast to a type of the same signedness that is no wider than the underlying type of the expression	Required	Yes
Misra2004:10.4	The value of a complex expression of floating type shall only be cast to a floating type that is narrower or of the same size	Required	Yes
Misra2004:10.5	If the bitwise operators ~ and << are applied to an operand of underlying type unsigned char or unsigned short, the result shall be immediately cast to the underlying type of the operand	Required	Yes
Misra2004:10.6	A "U" suffix shall be applied to all constants of unsigned type	Required	Yes
Misra2004:11.1	Conversions shall not be performed between a pointer to a function and any type other than an integral type	Required	Yes
Misra2004:11.2	Conversions shall not be performed between a pointer to object and any type other than an integral type, another pointer to object type or a pointer to void	Required	Yes
Misra2004:11.3	A cast should not be performed between a pointer type and an integral type	Advisory	Yes
Misra2004:11.4	A cast should not be performed between a pointer to object type and a different pointer to object type	Advisory	Yes
Misra2004:11.5	A cast shall not be performed that removes any const or volatile qualification from the type addressed by a pointer	Required	Yes
Misra2004:12.1	Limited dependence should be placed on C's operator precedence rules in expressions	Advisory	Yes
Misra2004:12.2	The value of an expression shall be the same under any order of evaluation that the standard permits	Required	No
Misra2004:12.3	The sizeof operator shall not be used on expressions that contain side effects	Required	Yes
Misra2004:12.4	The right-hand operand of a logical && or operator shall not contain side effects	Required	No
Misra2004:12.5	The operands of a logical && or shall be primary-expressions	Required	No
Misra2004:12.6	The operands of logical operators (&&, and !) should be effectively Boolean. Expressions that are effectively Boolean should not be used as operands to operators other than (&&, , !, =, ==, != and ?:)	Advisory	Yes
Misra2004:12.7	Bitwise operators shall not be applied to operands whose underlying type is signed	Required	Yes

Misra2004:12.8	The right-hand operand of a shift operator shall lie between zero and one less than the width in bits of the underlying type of the left-hand operand	Required	Yes
Misra2004:12.9	The unary minus operator shall not be applied to an expression whose underlying type is unsigned	Required	Yes
Misra2004:12.10	The comma operator shall not be used	Required	Yes
Misra2004:12.11	Evaluation of constant unsigned integer expressions should not lead to wraparound	Advisory	Yes
Misra2004:12.12	The underlying bit representations of floating-point values shall not be used	Required	No
Misra2004:12.13	The increment (++) and decrement (--) operators should not be mixed with other operators in an expression	Advisory	Yes
Misra2004:13.1	Assignment operators shall not be used in expressions that yield a Boolean value	Required	No
Misra2004:13.2	Tests of a value against zero should be made explicit, unless the operand is effectively Boolean	Advisory	Yes
Misra2004:13.3	Floating-point expressions shall not be tested for equality or inequality	Required	Yes
Misra2004:13.4	The controlling expression of a for statement shall not contain any objects of floating type	Required	Yes
Misra2004:13.5	The three expressions of a for statement shall be concerned only with loop control	Required	Yes
Misra2004:13.6	Numeric variables being used within a for loop for iteration counting shall not be modified in the body of the loop	Required	Yes
Misra2004:13.7	Boolean operations whose results are invariant shall not be permitted	Required	Yes
Misra2004:14.1	There shall be no unreachable code	Required	Yes
Misra2004:14.2	All non-null statements shall either (a) have at least one side-effect however executed, or (b) cause control flow to change	Required	Yes
Misra2004:14.3	Before preprocessing, a null statement shall only occur on a line by itself; it may be followed by a comment provided that the first character following the null statement is a white-space character	Required	Yes
Misra2004:14.4	The goto statement shall not be used	Required	Yes
Misra2004:14.5	The continue statement shall not be used	Required	Yes
Misra2004:14.6	For any iteration statement there shall be at most one break statement used for loop termination	Required	Yes
Misra2004:14.7	A function shall have a single point of exit at the end of the function	Required	Yes
Misra2004:14.8	The statement forming the body of a switch, while, do ... while or for statement shall be a compound statement	Required	Yes
Misra2004:14.9	An if (expression) construct shall be followed by a compound statement. The else keyword shall be followed by either a compound statement, or another if statement	Required	Yes
Misra2004:14.10	All if . else if constructs shall be terminated with an else clause	Required	Yes
Misra2004:15.0	The MISRA C switch syntax shall be used	Required	Yes
Misra2004:15.1	A switch label shall only be used when the most closely-enclosing compound statement is the body of a switch statement	Required	Yes
Misra2004:15.2	An unconditional break statement shall terminate every non-empty switch clause	Required	Yes
Misra2004:15.3	The final clause of a switch statement shall be the default clause	Required	Yes
Misra2004:15.4	A switch expression shall not represent a value that is effectively Boolean	Required	Yes
Misra2004:15.5	Every switch statement shall have at least one case clause	Required	Yes
Misra2004:16.1	Functions shall not be defined with variable numbers of arguments	Required	No
Misra2004:16.2	Functions shall not call themselves, either directly or indirectly	Required	Yes
Misra2004:16.3	Identifiers shall be given for all of the parameters in a function prototype declaration	Required	Yes
Misra2004:16.4	The identifiers used in the declaration and definition of a function shall be identical	Required	Yes
Misra2004:16.5	Functions with no parameters shall be declared and defined with the parameter list void	Required	Yes
Misra2004:16.6	The number of arguments passed to a function shall match the number of parameters	Required	Yes
Misra2004:16.7	A pointer parameter in a function prototype should be declared as pointer to const if the pointer is not used to modify the addressed object	Advisory	Yes
Misra2004:16.8	All exit paths from a function with non-void return type shall have an explicit return statement with an expression	Required	Yes

Misra2004:16.9	A function identifier shall only be used with either a preceding &, or with a parenthesised parameter list, which may be empty	Required	Yes
Misra2004:16.10	If a function returns error information, then that error information shall be tested	Required	Yes
Misra2004:17.1	Pointer arithmetic shall only be applied to pointers that address an array or array element	Required	Yes
Misra2004:17.2	Pointer subtraction shall only be applied to pointers that address elements of the same array	Required	Yes
Misra2004:17.3	>, >=, <, <= shall not be applied to pointer types except where they point to the same array	Required	Yes
Misra2004:17.4	Array indexing shall be the only allowed form of pointer arithmetic	Required	Yes
Misra2004:17.5	The declaration of objects should contain no more than 2 levels of pointer indirection	Advisory	No
Misra2004:17.6	The address of an object with automatic storage shall not be assigned to another object that may persist after the first object has ceased to exist	Required	Yes
Misra2004:18.1	All structure or union types shall be complete at the end of a translation unit	Required	No
Misra2004:18.2	An object shall not be assigned to an overlapping object	Required	Yes
Misra2004:18.3	An area of memory shall not be reused for unrelated purposes	Required	No
Misra2004:18.4	Unions shall not be used	Required	Yes
Misra2004:19.1	#include statements in a file should only be preceded by other preprocessor directives or comments	Advisory	Yes
Misra2004:19.2	Non-standard characters should not occur in header file names in #include directives	Advisory	Yes
Misra2004:19.3	The #include directive shall be followed by either a or "filename" sequence	Required	Yes
Misra2004:19.4	C macros shall only expand to a braced initialiser, a constant, a string literal, a parenthesised expression, a type qualifier, a storage class specifier, or a do-whilezero construct	Required	Yes
Misra2004:19.5	Macros shall not be #define'd or #undef'd within a block	Required	Yes
Misra2004:19.6	#undef shall not be used	Required	Yes
Misra2004:19.7	A function should be used in preference to a function-like macro	Advisory	Yes
Misra2004:19.8	A function-like macro shall not be invoked without all of its arguments	Required	No
Misra2004:19.9	Arguments to a function-like macro shall not contain tokens that look like preprocessing directives	Required	Yes
Misra2004:19.10	In the definition of a function-like macro each instance of a parameter shall be enclosed in parentheses unless it is used as the operand of # or ##	Required	No
Misra2004:19.11	All macro identifiers in preprocessor directives shall be defined before use, except in #ifdef and #ifndef preprocessor directives and the defined() operator	Required	Yes
Misra2004:19.12	There shall be at most one occurrence of the # or ## preprocessor operators in a single macro definition	Required	No
Misra2004:19.13	The # and ## preprocessor operators should not be used	Advisory	Yes
Misra2004:19.14	The defined preprocessor operator shall only be used in one of the two standard forms	Required	No
Misra2004:19.15	Precautions shall be taken in order to prevent the contents of a header file being included twice	Required	No
Misra2004:19.16	Preprocessing directives shall be syntactically meaningful even when excluded by the preprocessor	Required	No
Misra2004:19.17	All #else, #elif and #endif preprocessor directives shall reside in the same file as the #if or #ifdef directive to which they are related	Required	Yes
Misra2004:20.1	Reserved identifiers, macros and functions in the standard library, shall not be defined, redefined or undefined	Required	Yes
Misra2004:20.2	The names of standard library macros, objects and functions shall not be reused	Required	Yes
Misra2004:20.3	The validity of values passed to library functions shall be checked	Required	Yes
Misra2004:20.4	Dynamic heap memory allocation shall not be used	Required	Yes
Misra2004:20.5	The error indicator errno shall not be used	Required	No
Misra2004:20.6	The macro offsetof, in library , shall not be used	Required	Yes
Misra2004:20.7	The setjmp macro and the longjmp function shall not be used	Required	Yes
Misra2004:20.8	The signal handling facilities of shall not be used	Required	Yes
Misra2004:20.9	The input/output library shall not be used in production code	Required	Yes

Misra2004:20.10	The library functions atof, atoi and atol from library shall not be used	Required	Yes
Misra2004:20.11	The library functions abort, exit, getenv and system from library shall not be used	Required	Yes
Misra2004:20.12	The time handling functions of library shall not be used	Required	Yes
Misra2004:21.1	Minimisation of run-time failures shall be ensured by the use of at least one of (a) static analysis tools/techniques; (b) dynamic analysis tools/techniques; (c) explicit coding of checks to handle run-time faults	Required	No



MISRA C:2004 BROAD MAPPING (CODESONAR V7.2)

The following table contains CodeSonar warning classes that are broadly mapped to MISRA C:2004 categories.

Rule	Rule Name	Category	Supported
Misra2004:1.1	All code shall conform to ISO/IEC 9899:1990 "Programming languages C", amended and corrected by ISO/IEC 9899/COR1:1995, ISO/IEC 9899/AMD1:1995, and ISO/IEC 9899/COR2:1996	Required	Yes
Misra2004:1.2	No reliance shall be placed on undefined or unspecified behaviour	Required	No
Misra2004:1.3	Multiple compilers and/or languages shall only be used if there is a common defined interface standard for object code to which the languages/compilers/assemblers conform	Required	No
Misra2004:1.4	The compiler/linker shall be checked to ensure that 31 character significance and case sensitivity are supported for external identifiers	Required	No
Misra2004:1.5	Floating-point implementations should comply with a defined floating-point standard	Advisory	No
Misra2004:2.1	Assembly language shall be encapsulated and isolated	Required	Yes
Misra2004:2.2	Source code shall only use /* ... */ style comments	Required	Yes
Misra2004:2.3	The character sequence /* shall not be used within a comment	Required	Yes
Misra2004:2.4	Sections of code should not be "commented out"	Advisory	Yes
Misra2004:3.1	All usage of implementation-defined behaviour shall be documented	Required	No
Misra2004:3.2	The character set and the corresponding encoding shall be documented	Required	No
Misra2004:3.3	The implementation of integer division in the chosen compiler should be determined, documented and taken into account	Advisory	No
Misra2004:3.4	All uses of the #pragma directive shall be documented and explained	Required	No
Misra2004:3.5	The implementation defined behaviour and packing of bitfields shall be documented if being relied upon	Required	No
Misra2004:3.6	All libraries used in production code shall be written to comply with the provisions of this document, and shall have been subject to appropriate validation	Required	No
Misra2004:4.1	Only those escape sequences that are defined in the ISO C standard shall be used	Required	No
Misra2004:4.2	Trigraphs shall not be used	Required	Yes
Misra2004:5.1	Identifiers (internal and external) shall not rely on the significance of more than 31 characters	Required	Yes
Misra2004:5.2	Identifiers in an inner scope shall not use the same name as an identifier in an outer scope, and therefore hide that identifier	Required	Yes
Misra2004:5.3	A typedef name shall be a unique identifier	Required	Yes
Misra2004:5.4	A tag name shall be a unique identifier	Required	Yes
Misra2004:5.5	No object or function identifier with static storage duration should be reused	Advisory	Yes
Misra2004:5.6	No identifier in one name space should have the same spelling as an identifier in another name space, with the exception of structure member and union member names	Advisory	No
Misra2004:5.7	No identifier name should be reused	Advisory	Yes
Misra2004:6.1	The plain char type shall be used only for storage and use of character values	Required	Yes
Misra2004:6.2	signed and unsigned char type shall be used only for the storage and use of numeric values	Required	Yes
Misra2004:6.3	typedefs that indicate size and signedness should be used in place of the basic numerical types	Advisory	Yes
Misra2004:6.4	Bit fields shall only be defined to be of type unsigned int or signed int	Required	Yes
Misra2004:6.5	Bit fields of signed type shall be at least 2 bits long	Required	Yes
Misra2004:7.1	Octal constants (other than zero) and octal escape sequences shall not be used	Required	Yes
Misra2004:8.1	Functions shall have prototype declarations and the prototype shall be visible at both the function definition and call	Required	Yes
Misra2004:8.2	Whenever an object or function is declared or defined, its type shall be explicitly stated	Required	No
Misra2004:8.3	For each function parameter the type given in the declaration and definition shall be identical, and the return types shall also be identical	Required	Yes



Misra2004:8.4	If objects or functions are declared more than once their types shall be compatible	Required	Yes
Misra2004:8.5	There shall be no definitions of objects or functions in a header file	Required	Yes
Misra2004:8.6	Functions shall be declared at file scope	Required	Yes
Misra2004:8.7	Objects shall be defined at block scope if they are only accessed from within a single function	Required	Yes
Misra2004:8.8	An external object or function shall be declared in one and only one file	Required	Yes
Misra2004:8.9	An identifier with external linkage shall have exactly one external definition	Required	Yes
Misra2004:8.10	All declarations and definitions of objects or functions at file scope shall have internal linkage unless external linkage is required	Required	Yes
Misra2004:8.11	The static storage class specifier shall be used in definitions and declarations of objects and functions that have internal linkage	Required	Yes
Misra2004:8.12	When an array is declared with external linkage, its size shall be stated explicitly or defined implicitly by initialisation	Required	Yes
Misra2004:9.1	All automatic variables shall have been assigned a value before being used	Required	Yes
Misra2004:9.2	Braces shall be used to indicate and match the structure in the non-zero initialisation of arrays and structures	Required	Yes
Misra2004:9.3	In an enumerator list, the "=" construct shall not be used to explicitly initialise members other than the first, unless all items are explicitly initialised	Required	Yes
Misra2004:10.1	The value of an expression of integer type shall not be implicitly converted to a different underlying type if: (a) it is not a conversion to a wider integer type of the same signedness, or (b) the expression is complex, or (c) the expression is not constant and is a function argument, or (d) the expression is not constant and is a return expression	Required	Yes
Misra2004:10.2	The value of an expression of floating type shall not be implicitly converted to a different type if: (a) it is not a conversion to a wider floating type, or (b) the expression is complex, or (c) the expression is a function argument, or (d) the expression is a return expression	Required	Yes
Misra2004:10.3	The value of a complex expression of integer type shall only be cast to a type of the same signedness that is no wider than the underlying type of the expression	Required	Yes
Misra2004:10.4	The value of a complex expression of floating type shall only be cast to a floating type that is narrower or of the same size	Required	Yes
Misra2004:10.5	If the bitwise operators ~ and << are applied to an operand of underlying type unsigned char or unsigned short, the result shall be immediately cast to the underlying type of the operand	Required	Yes
Misra2004:10.6	A "U" suffix shall be applied to all constants of unsigned type	Required	Yes
Misra2004:11.1	Conversions shall not be performed between a pointer to a function and any type other than an integral type	Required	Yes
Misra2004:11.2	Conversions shall not be performed between a pointer to object and any type other than an integral type, another pointer to object type or a pointer to void	Required	Yes
Misra2004:11.3	A cast should not be performed between a pointer type and an integral type	Advisory	Yes
Misra2004:11.4	A cast should not be performed between a pointer to object type and a different pointer to object type	Advisory	Yes
Misra2004:11.5	A cast shall not be performed that removes any const or volatile qualification from the type addressed by a pointer	Required	Yes
Misra2004:12.1	Limited dependence should be placed on C's operator precedence rules in expressions	Advisory	Yes
Misra2004:12.2	The value of an expression shall be the same under any order of evaluation that the standard permits	Required	No
Misra2004:12.3	The sizeof operator shall not be used on expressions that contain side effects	Required	Yes
Misra2004:12.4	The right-hand operand of a logical && or operator shall not contain side effects	Required	No
Misra2004:12.5	The operands of a logical && or shall be primary-expressions	Required	No
Misra2004:12.6	The operands of logical operators (&&, and !) should be effectively Boolean. Expressions that are effectively Boolean should not be used as operands to operators other than (&&, , !, =, ==, != and ?:)	Advisory	Yes
Misra2004:12.7	Bitwise operators shall not be applied to operands whose underlying type is signed	Required	Yes

Misra2004:12.8	The right-hand operand of a shift operator shall lie between zero and one less than the width in bits of the underlying type of the left-hand operand	Required	Yes
Misra2004:12.9	The unary minus operator shall not be applied to an expression whose underlying type is unsigned	Required	Yes
Misra2004:12.10	The comma operator shall not be used	Required	Yes
Misra2004:12.11	Evaluation of constant unsigned integer expressions should not lead to wraparound	Advisory	Yes
Misra2004:12.12	The underlying bit representations of floating-point values shall not be used	Required	No
Misra2004:12.13	The increment (++) and decrement (--) operators should not be mixed with other operators in an expression	Advisory	Yes
Misra2004:13.1	Assignment operators shall not be used in expressions that yield a Boolean value	Required	No
Misra2004:13.2	Tests of a value against zero should be made explicit, unless the operand is effectively Boolean	Advisory	Yes
Misra2004:13.3	Floating-point expressions shall not be tested for equality or inequality	Required	Yes
Misra2004:13.4	The controlling expression of a for statement shall not contain any objects of floating type	Required	Yes
Misra2004:13.5	The three expressions of a for statement shall be concerned only with loop control	Required	Yes
Misra2004:13.6	Numeric variables being used within a for loop for iteration counting shall not be modified in the body of the loop	Required	Yes
Misra2004:13.7	Boolean operations whose results are invariant shall not be permitted	Required	Yes
Misra2004:14.1	There shall be no unreachable code	Required	Yes
Misra2004:14.2	All non-null statements shall either (a) have at least one side-effect however executed, or (b) cause control flow to change	Required	Yes
Misra2004:14.3	Before preprocessing, a null statement shall only occur on a line by itself; it may be followed by a comment provided that the first character following the null statement is a white-space character	Required	Yes
Misra2004:14.4	The goto statement shall not be used	Required	Yes
Misra2004:14.5	The continue statement shall not be used	Required	Yes
Misra2004:14.6	For any iteration statement there shall be at most one break statement used for loop termination	Required	Yes
Misra2004:14.7	A function shall have a single point of exit at the end of the function	Required	Yes
Misra2004:14.8	The statement forming the body of a switch, while, do ... while or for statement shall be a compound statement	Required	Yes
Misra2004:14.9	An if (expression) construct shall be followed by a compound statement. The else keyword shall be followed by either a compound statement, or another if statement	Required	Yes
Misra2004:14.10	All if . else if constructs shall be terminated with an else clause	Required	Yes
Misra2004:15.0	The MISRA C switch syntax shall be used	Required	Yes
Misra2004:15.1	A switch label shall only be used when the most closely-enclosing compound statement is the body of a switch statement	Required	Yes
Misra2004:15.2	An unconditional break statement shall terminate every non-empty switch clause	Required	Yes
Misra2004:15.3	The final clause of a switch statement shall be the default clause	Required	Yes
Misra2004:15.4	A switch expression shall not represent a value that is effectively Boolean	Required	Yes
Misra2004:15.5	Every switch statement shall have at least one case clause	Required	Yes
Misra2004:16.1	Functions shall not be defined with variable numbers of arguments	Required	No
Misra2004:16.2	Functions shall not call themselves, either directly or indirectly	Required	Yes
Misra2004:16.3	Identifiers shall be given for all of the parameters in a function prototype declaration	Required	Yes
Misra2004:16.4	The identifiers used in the declaration and definition of a function shall be identical	Required	Yes
Misra2004:16.5	Functions with no parameters shall be declared and defined with the parameter list void	Required	Yes
Misra2004:16.6	The number of arguments passed to a function shall match the number of parameters	Required	Yes
Misra2004:16.7	A pointer parameter in a function prototype should be declared as pointer to const if the pointer is not used to modify the addressed object	Advisory	Yes
Misra2004:16.8	All exit paths from a function with non-void return type shall have an explicit return statement with an expression	Required	Yes

Misra2004:16.9	A function identifier shall only be used with either a preceding &, or with a parenthesised parameter list, which may be empty	Required	Yes
Misra2004:16.10	If a function returns error information, then that error information shall be tested	Required	Yes
Misra2004:17.1	Pointer arithmetic shall only be applied to pointers that address an array or array element	Required	Yes
Misra2004:17.2	Pointer subtraction shall only be applied to pointers that address elements of the same array	Required	Yes
Misra2004:17.3	>, >=, <, <= shall not be applied to pointer types except where they point to the same array	Required	Yes
Misra2004:17.4	Array indexing shall be the only allowed form of pointer arithmetic	Required	Yes
Misra2004:17.5	The declaration of objects should contain no more than 2 levels of pointer indirection	Advisory	No
Misra2004:17.6	The address of an object with automatic storage shall not be assigned to another object that may persist after the first object has ceased to exist	Required	Yes
Misra2004:18.1	All structure or union types shall be complete at the end of a translation unit	Required	No
Misra2004:18.2	An object shall not be assigned to an overlapping object	Required	Yes
Misra2004:18.3	An area of memory shall not be reused for unrelated purposes	Required	No
Misra2004:18.4	Unions shall not be used	Required	Yes
Misra2004:19.1	#include statements in a file should only be preceded by other preprocessor directives or comments	Advisory	Yes
Misra2004:19.2	Non-standard characters should not occur in header file names in #include directives	Advisory	Yes
Misra2004:19.3	The #include directive shall be followed by either a or "filename" sequence	Required	Yes
Misra2004:19.4	C macros shall only expand to a braced initialiser, a constant, a string literal, a parenthesised expression, a type qualifier, a storage class specifier, or a do-whilezero construct	Required	Yes
Misra2004:19.5	Macros shall not be #define'd or #undef'd within a block	Required	Yes
Misra2004:19.6	#undef shall not be used	Required	Yes
Misra2004:19.7	A function should be used in preference to a function-like macro	Advisory	Yes
Misra2004:19.8	A function-like macro shall not be invoked without all of its arguments	Required	No
Misra2004:19.9	Arguments to a function-like macro shall not contain tokens that look like preprocessing directives	Required	Yes
Misra2004:19.10	In the definition of a function-like macro each instance of a parameter shall be enclosed in parentheses unless it is used as the operand of # or ##	Required	No
Misra2004:19.11	All macro identifiers in preprocessor directives shall be defined before use, except in #ifdef and #ifndef preprocessor directives and the defined() operator	Required	Yes
Misra2004:19.12	There shall be at most one occurrence of the # or ## preprocessor operators in a single macro definition	Required	No
Misra2004:19.13	The # and ## preprocessor operators should not be used	Advisory	Yes
Misra2004:19.14	The defined preprocessor operator shall only be used in one of the two standard forms	Required	No
Misra2004:19.15	Precautions shall be taken in order to prevent the contents of a header file being included twice	Required	No
Misra2004:19.16	Preprocessing directives shall be syntactically meaningful even when excluded by the preprocessor	Required	No
Misra2004:19.17	All #else, #elif and #endif preprocessor directives shall reside in the same file as the #if or #ifdef directive to which they are related	Required	Yes
Misra2004:20.1	Reserved identifiers, macros and functions in the standard library, shall not be defined, redefined or undefined	Required	Yes
Misra2004:20.2	The names of standard library macros, objects and functions shall not be reused	Required	Yes
Misra2004:20.3	The validity of values passed to library functions shall be checked	Required	Yes
Misra2004:20.4	Dynamic heap memory allocation shall not be used	Required	Yes
Misra2004:20.5	The error indicator errno shall not be used	Required	No
Misra2004:20.6	The macro offsetof, in library, shall not be used	Required	Yes
Misra2004:20.7	The setjmp macro and the longjmp function shall not be used	Required	Yes
Misra2004:20.8	The signal handling facilities of shall not be used	Required	Yes

Misra2004:20.9	The input/output library shall not be used in production code	Required	Yes
Misra2004:20.10	The library functions atof, atoi and atol from library shall not be used	Required	Yes
Misra2004:20.11	The library functions abort, exit, getenv and system from library shall not be used	Required	Yes
Misra2004:20.12	The time handling functions of library shall not be used	Required	Yes
Misra2004:21.1	Minimisation of run-time failures shall be ensured by the use of at least one of (a) static analysis tools/techniques; (b) dynamic analysis tools/techniques; (c) explicit coding of checks to handle run-time faults	Required	No

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