

WG 14 N2178

TS 18661-1 DR 16

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Reference Document: TS 18661-1

Subject: tgmath cbrt macro

Summary

This DR addresses a problem noted by Joseph Myers in emails SC22WG14.14743 and 14744:

... the example [in TS 18661-1 clause 16, for 7.25#6b – see below] implies that "#undef cbrtl" before calling the cbrt type-generic macro would mean it's not affected by constant rounding modes, but the actual normative text says "is affected by constant rounding modes" with no such caveat.

and

... neither example definition [in C11 or TS 18661-1] is valid because they might call a block-scope cbrtf / cbrtl; they need to avoid such a block-scope identifier, or a macro defined by the user, while still depending on whether expansion of the standard header cbrtf / cbrtl macros has been suppressed at that point.

The text in question is:

[6b] A type-generic macro corresponding to a function indicated in the table in 7.6.1a is affected by constant rounding modes (7.6.2). Note that the type-generic macro definition in the example in 6.5.1.1 does not conform to this specification. A conforming macro could be implemented as follows:

```
#define cbrt(X) _Generic((X),  
                        long double: cbrtl(X),  
                        default: _Roundwise_cbrt(X),  
                        float: cbrtf(X)  
                        )
```

where `_Roundwise_cbrt()` is equivalent to `cbrt()` invoked without macro-replacement suppression.

The cause of the problems is the use of `cbrtl` and `cbrtf` in the macro definition. The suggested TC below replaces these uses with `_Roundwise_` prefixed identifiers similar to `_Roundwise_cbrt`.

Suggested Technical Corrigendum

In TS 18661-1, clause 16, replace:

```
#define cbrt(X) _Generic((X), \
    long double: cbrt1(X), \
    default: _Roundwise_cbrt(X), \
    float: cbrtf(X) \
)
```

where `_Roundwise_cbrt()` is equivalent to `cbrt()` invoked without macro-replacement suppression.

with

```
#define cbrt(X) _Generic((X), \
    long double: _Roundwise_cbrt1(X), \
    default: _Roundwise_cbrt(X), \
    float: _Roundwise_cbrtf(X) \
)
```

where `_Roundwise_cbrt1()`, `_Roundwise_cbrt()`, and `_Roundwise_cbrtf()` are equivalent to `cbrt1()`, `cbrt()`, and `cbrtf()`, respectively, invoked without macro-replacement suppression.