

## Annex C (normative)

### Check digit for the 13 digit ISBN

**C.1** The purpose of the check digit is to guard against errors resulting from improper transcription of an ISBN.

**C.2** The check digit for a 13 digit ISBN shall be 1 alphanumeric character using Arabic numerals 0 through 9. The check digit shall be displayed as the final character at the end of the ISBN character string.

**C.3** The check digit for a 13 digit ISBN is calculated using a weighting algorithm which utilizes a modulus 10 check.

**C.4** When an ISBN is displayed in human readable form, it shall be preceded by the letters ISBN. Hyphens should be used to enhance readability and to provide improved understanding of the internal structure of the number but are not an integral part of the number itself.

#### EXAMPLE:

*Modulus 10 algorithm to calculate check digit for a 13 digit ISBN (check digit unknown):*

Each of the first 12 digits of the ISBN is alternately multiplied by 1 and 3. The check digit is equal to 10 minus the remainder resulting from dividing the sum of the weighted products of the first 12 digits by 10 with one exception. If this calculation results in an apparent check digit of 10, the check digit is 0.

Use the following steps to calculate the check digit for the ISBN 978-0-11-000222-?:

Step 1: Determine the sum of the weighted products for the first 12 digits of the ISBN (see following table).

	Prefix element			Registration Group element	Registrant element		Publication element						Check digit	Sum
ISBN	9	7	8	0	1	1	0	0	0	2	2	2	?	
Weight	1	3	1	3	1	3	1	3	1	3	1	3	-	
Product	9	21	8	0	1	3	0	0	0	6	2	6	-	56

Step 2: Divide the sum of the weighted products of the first 12 digits of the ISBN calculated in step 1 by 10 determining the remainder.

$$56 / 10 = 5 \quad \text{remainder} = 6$$

Step 3: Subtract the remainder calculated in step 2 from 10. The resulting difference is the value of the check digit with one exception. If the remainder from step 2 is 0, the check digit is 0.

$$10 - 6 = 4$$

$$\text{Check digit} = 4$$

$$\text{ISBN} = 978-0-11-000222-4$$

The following mathematical formula is an alternative way of expressing the calculation of the check digit:

Check digit = mod 10 (10 – (mod 10 (sum of weighted products of the first 12 ISBN digits)))

Check digit = mod 10 (10 – (mod 10 (56)))

Check digit = 4

The sum of the weighted products of the first 12 digits plus the check digit must be divisible by 10 without a remainder for the ISBN to be valid.

NOTE – The length of the registration group, registrant and publication elements are variable and may not always be the same as in the example table above. Not all registration group and registrant combinations are valid. See Annex D for the formula required to validate and split an ISBN.