

# FUNCTIONAL LANGUAGE IN TECHNICAL DOCUMENTATION

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## BASIC ASSUMPTIONS REGARDING THE LANGUAGE FUNCTION AS A CARRIER OF TECHNICAL INFORMATION

*“The text of the manual should include simple and comprehensible words forming direct expressions combined into simple sentences. It is an implementation of the 'one expression, one meaning' rule. The text structure should be understandable.”*

PN:EN 82079 standard

### ABSTRACT

*This chapter focuses on the capabilities of the Polish language and discusses them in the context of technical texts. Why certain forms are better than others? How to identify them? This publication attempts at systemizing the assumptions regarding Polish language in technical communication. Hopefully, translators will find it useful. Although they are not authors of texts, they create localized versions of them, and understanding the author's intentions should be helpful during translation.*

**Comments Regarding Safety** — information regarding safety, collected or categorized in a document or in a section of a document in a considered and organized system in order to present safety measures, increase the knowledge on maintaining safety and provide the grounds for carrying out safety trainings for users.

**Document** — a collection of structured information intended for human use, which may be managed and shared as a unit between users and systems.

**Instructions for Use** — the information provided to user by the supplier of the product that include all necessary instructions regarding actions that should be taken in order to use the product in a safe and effective manner.

**Manual** — a document including the information regarding the use of the product.

**Product Safety Label** — a label on a product that informs the user of at least one potential hazard and presents safety measures and/or actions required to prevent these hazards.

**Technical Communication** — preparing and sharing the information regarding technical processes in a form comprehensible for users.

**Warning Message** — a message regarding safety which warns the user against hazards and provides instructions on how to avoid them.

## 1 A FEW WORDS ON THE STANDARD

The standard's introduction says:

*“This standard is addressed to product manufacturers, technical editors, technical illustrators, software developers, translators and other persons who are responsible for developing concept and preparing instructions.”*

PN:EN 82079 (formerly PN:EN 62079) — *Preparation of instructions for use — Structuring, content, and presentation* includes various aspects of product documentation, such as general guidelines on the language used in instructions. Some criteria, as indicated in the standard, are as follows:

- Comprehensibility of the text — if the instructions are to be read by unqualified users, they should be easily understood. Necessary professional terms that a non-professional may not understand should be explained.
- Instruction users — each instruction should be addressed to only one group of users. If the product requires addressing various target groups, separate documents should be made.
- The terminology should be consistent in all parts of the documentation.
- The information should be formed in a simple and possibly shortest way and consequently include professional terms and units as well as provide clear explanation of technical terms that are not a part of common language.
- One sentence — one instruction.
- Address the user directly.
- Use verbs in active voice instead of passive.
- Do not use verbal nouns. Use verbs only.
- Use strong instructive forms ordering to perform actions and avoid weak forms.

Rules	Recommended	Not recommended
<i>Use active voice.</i>	<i>Wyłącz prąd.</i>	<i>Upewnij się, że prąd jest wyłączony.</i>
<i>Use strong forms.</i>	<i>Nie usuwaj etykiet.</i>	<i>Nie powinieneś usuwać etykiet.</i>
<i>Use verbs.</i>	<i>Stosować, utrzymać, unikać.</i>	<i>Zastosowanie, utrzymanie, unikanie.</i>
<i>Address the user directly.</i>	<i>Przyciągnąć/pociągnąć do siebie czarną dźwignię.</i>	<i>Użytkownik powinien odciągnąć czarną dźwignię w kierunku od maszyny.</i>

As seen above, the guidelines included in the standard do not refer to the specific language directly but only suggest some rules. Before we discuss the matters closely related to Polish language, let us say a few words on basic rules applying in general to the language of documentation, i.e. the language of source texts that the translators work on.

### 1.1 Safety Instructions

Particular attention should be drawn to safety instructions. From a translator point of view it may seem that safety instructions constitute a half of the documentation to be translated. Currently, the Polish law does not regulate this issue and the documentation standard acts as a supplementary

document, which is non-harmonized and known by few manufacturers. From the EU perspective, however, the standard is of significant importance and therefore it is worth knowing.

The new version of the documentation standard includes organized methods of warning against hazards and the structure of warning instructions.

Since currently there is no Polish nomenclature in force, the German and English versions below are binding, and the Polish versions are the expressions used most often. There are at least several expressions used inconsistently and as a result the level of hazard related to particular expressions is ambiguous for an average user.

The gradation of hazards in PN:EN 82079 is a modified gradation from the American standard ANSI Z535.6:

<i>Danger</i>	<i>Gefahr</i>	<i>Niebezpieczeństwo</i>	<i>High hazard level which will cause death or serious injuries, if appropriate preventive measures are not taken.</i>
<i>Warning</i>	<i>Warnung</i>	<i>Ostrzeżenie</i>	<i>Medium hazard level which may cause death or serious injuries, if appropriate preventive measures are not taken.</i>
<i>Caution</i>	<i>Vorsicht</i>	<i>Przestroga</i>	<i>Low hazard level which may cause minor or moderate injuries, if appropriate preventive measures are not taken.</i>

A correct safety instruction should include:

- Graphic symbol
- Source and type of hazard
- Consequences
- Clear preventive measures

<b>Source</b>	<i><b>WARNING!</b></i> <i>Do not position the equipment so it is difficult for disconnecting the power plug.</i> <i>Check the correct assembly, paying particular attention to air hoses connector.</i>
<b>Translation</b>	<i><b>OSTRZEŻENIE!</b></i> <i>Nie umieszczać sprzętu w sposób, który utrudni odłączenie wtyczki zasilania.</i> <i>Sprawdzić połączenia, zwracając szczególną uwagę na złącza przewodu powietrza.</i>

Polish instructions still include randomly chosen signal words which makes the warning of hazard level unambiguous. The recommended translations that are most often used are as follows:

- Danger – Niebezpieczeństwo
- Warning – Ostrzeżenie
- Caution – Przestroga

Also, additional instructions are often used, which are not safety instructions but appear in a similar form and can be also identified by signal words. In this case, there is greater flexibility both in the selection of a signal word and the content structure.

<i>Notice</i>	<i>Hinweis</i>	<i>Uwaga</i>	<i>Potentially hazardous situation which may cause damage to property.</i>
<i>Important</i>	<i>Wichtig</i>	<i>Ważne</i>	<i>Helpful information.</i>

A lot of Polish texts includes the word *Uwaga*, therefore it should not be used in editing as a signal word for hazard.

## 1.2 Short Sentences

The rule of using short sentences results from the primary objective to communicate technical information in a comprehensible manner. Short sentences make the text:

- Easy to read
- Unambiguous
- Easy to translate

Technical documentation is not literature. The main purpose of technical texts is to communicate required information to users so that they can use the product in a safe and confident manner.

Short sentences in documentation reduce the risk of misunderstanding during reading and further processing of the text, e.g. in translation. If a section of the instructions for use needs to be read at least two times in order to be understood, this means that it definitely does not comply with the requirements.

<b>Incorrect form</b>	<i>W skład urządzenia wchodzi czujniki, które dostarczają niezbędnych, niezawodnych sygnałów dotyczących pozycji i położenia końcowych, sprawdzając się zarówno jako nadajniki impulsu do zadań przeliczeniowych, jak i do monitorowania przestojów.</i>
<b>Correct form</b>	<i>W skład urządzenia wchodzi czujniki. Dostarczają one niezbędnych, niezawodnych sygnałów dotyczących pozycji i położenia końcowych. Sprawdzają się zarówno jako nadajniki impulsu do zadań przeliczeniowych, jak i do monitorowania przestojów.</i>

## 1.3 Modal Verbs

The general rule of editing technical texts is to avoid modal verbs where possible. The optional use of modal verbs should be well considered and have specific purpose.

Modal verbs are used for changing the meaning of the verb connected with them. Such a change of the verb meaning may be undesirable and even result in misunderstanding of the intended text message.

<b>Incorrect form</b>	<i>Po zakończeniu prac naprawczych można napętnić układ. (You may fill the system after completion of repair works.)</i>
<b>Correct form</b>	<i>Po zakończeniu prac naprawczych napętnić układ. (Fill the system after completion of repair works.)</i>

Można (may) – meaning not necessary, optional? Should the system be filled in or not? This sentence does not really instruct the user what to do. The sentence without a modal verb is clear.

In terms of colloquial language, we would say that these sentences are the same and in addition the second one sounds awkward. It may be different than spoken language but it clearly instructs the reader what should be done. Only unambiguous texts protect both the manufacturer and the user from adverse consequences of inappropriately written instructions for use.

If, according to the example above, *można napełnić układ (you may fill in the system)*, it can be presumed that nothing will happen if the user does not do it. Then, another user can activate the system, which will start running dry and may, for instance, seize.

Therefore, in general, modal verbs are rarely and carefully applied in instructions for use.

## 1.4 Simplicity

The style of technical documents should be simple in order to achieve their intended purpose. It should not be considered as something wrong. We should rather see this simplified style as a kind of art and try to apply it in translation.

The simplicity, often referred to as crudity, in the style of technical communication is actually not easy to achieve. Just take any device you find and try to write clear instructions for its use. It will soon turn out not to be easy at all. It should be remembered that educating technical editors is a must.

In case of consumer products, the instructions should enable all potential buyers to handle these products properly. Potential buyers include both educated persons, who may even have relevant expertise (e.g. regarding television and radio equipment), and persons with a lower education level, who do not have professional knowledge.

<b>Incorrect form</b>	<i>Zgodne z przepisami poinstruowanie personelu obsługującego poprzez podanie odpowiednich procedur jest obowiązkiem administratora.</i>
<b>Correct form</b>	<i>Zgodnie z przepisami, administrator musi przeszkolić personel obsługujący z zakresu procedur.</i>

## 1.5 A Form that Supports the Message

One of the keys to understanding the language of technical communication is remembering that it aims at minimizing the number of words by using other means of communication.

This means drawings and pictures as well as carefully defined and repetitive styles applied in documents.

At the beginning of the instructions for use there is a chapter on styles and conventions, in which the explanation of all applied ways of communication can be included.

For instance, if the symbol of *a hand* represents action and the lists marked with that symbol include actions to be done step by step, there is no need to explain it in the following chapters. The user will know that a chapter “*Connecting TV*” orders to do the actions marked with a symbol of *a hand* step by step. This also applies to safety instructions, lists of components and other common sections of the documents.

## 1.6 Consistency

Technical documentation must be consistent. An element or action must appear under the same name throughout a document. “Flowery language”, pronouns and synonyms create confusion and decrease readability.

<b>Source</b>	<i>Description of phenomenon</i>
<b>Translation</b>	<i>Opis zjawiska</i>
<b>Alternative translation</b>	<i>Opis usterki</i>

Both translations are correct. The choice of version is up to a translator and must be used consequently. If the word *phenomenon* is appearing in a document as a reference to a fault (*usterka*), then using the word *usterka* would be clearer and therefore better. However, if this word refers to various situations, not only faults, then more general word should be used, such as *phenomenon*, because the word *usterka* may mislead the user.

Also, the content should be presented in a consistent way. If a document does not have consistent and comprehensible structure, it will be confusing and the author will not achieve their purpose.

## 1.7 Unambiguity Supports the Translation Process

All the above features have influence on the final form of the text in a document. If a document is written in a simple and unambiguous style, has a structure that supports the message, each statement is comprehensible and does not bring concerns regarding interpretation, and the whole text is consistent, then the translation would be probably of much better quality than a translation based on a low quality text that does not comply with basic rules of functional language.

For these purposes, the source text is often subject to evaluation whether it meets basic conditions set for a correct source text intended for translation.

Some of the criteria subject to evaluation are as follows:

- Using exceptionally specialist vocabulary.
- Incorrect prepositions, linking words or verbs, which dilute the message (e.g. the word *względnie* (*relatively*), modal verbs, etc.).
- Overuse of passive voice.
- Mixed tenses used in the text.
- Unnecessary language innovations, e.g. new words that can be replaced with the existing ones.
- Unexplained abbreviations.
- Synonyms in the text.
- Long and complex sentences.
- Using only one verb in a sentence.
- Using exactly the same forms for the same actions.
- Providing instructions step by step (lists).
- Putting related content in one paragraph.
- Contradictions in the content.

- Too many references.
- Ambiguous references.

All of the above can be assessed while preparing the text for translation and, depending on a result, the appropriate steps can be taken to ensure best possible quality. Unfortunately, working with poorly edited texts is considerably more difficult and the translation will not be very good. Although a translator can make every effort to provide the best possible translation, correcting the structure of the document or other formal mistakes is not possible at this stage.

<b>Source</b>	<i>Remark to SF6 Inventory.</i>
<b>Translation</b>	<i>Uwaga dotycząca spisu inwentarza SF6.</i>
<b>Alternative translation</b>	<i>Uwaga dotycząca magazynowania SF6.</i>

In the example above, the use of the word *inventory* causes translation problems. If it is not clear whether it means keeping inventory or the list of stock, the translator is not able to translate this sentence correctly.

## 2 WHAT SHOULD A TRANSLATOR TAKE INTO ACCOUNT

### 2.1 Target Group

Before translating, a translator should know whom the document is addressed to. This has quite significant influence on the translation and imposes some limits on the translator, who may not be qualified enough to perform certain tasks.

Instructions for use constitute a great part of the so-called technical translations. This type of documents, however, is aimed at various target groups. While translating instructions for use of consumer products, it should be borne in mind that they are not addressed to professionals and, as far as possible, the use of exceptionally specialist terminology should be avoided, even if the translator understands it and considers it appropriate for the particular subject. In this type of texts, the applied language structures must comply with the common language standard, which is understandable for all potential readers.

The case of exceptionally specialist texts is exactly the opposite – they are aimed at professionals, therefore the language can be highly technical and there is no need to provide additional explanations of specialist vocabulary. In these texts, we can presuppose certain level of the user's knowledge. This type of texts may or even should include professional language typical for the particular field.

A well written text, even highly professional, should still be comprehensible for a translator, even if it requires extending knowledge, additional reading and analyzing the text before starting translation. It is the only way to avoid the situation when the translation turns out to be rubbish.

<b>Source</b>	<i>Control contains human red blood cells, simulated white blood cells, mammalian platelets, and CRP control fluid.</i>
<b>Translation</b>	<i>Kontrola zawiera ludzkie erytrocyty, sztuczne leukocyty, trombocyty ssacze oraz płyn kontrolny CRP.</i>
<b>Alternative translation</b>	<i>Roztwór kontrolny zawiera ludzkie krwinki czerwone, sztuczne krwinki białe, płytki krwi ssaków oraz roztwór do kontroli oznaczenia CRP (C Reactive Protein – białko C-reaktywne).</i>

The first version is appropriate for texts aimed at professionals, for example in the instructions for instrument maintenance. The second may be used for example in patient leaflets.

## 2.2 Consistent Terminology

A frequent problem that translators must deal with is verifying whether there are mistakes in the source text. In a correctly edited technical document, there should be no randomness and ambiguity regarding terminology and each technical term should have its own translation. It is one of the most common sources of mistakes, as translators either unify the terminology arbitrarily, which is contrary to the author's intention, or do the opposite – use different term each time a synonym is unwisely used in the source. Unfortunately, the only efficient solution in such situation is a question to the client. However, it is important to pay attention and do not make arbitrary decisions.

## 2.3 Unambiguous Content

Translators should be familiar with the current requirements for technical documentation to translate technical texts in accordance with these standards.

There are two main reasons for the confusion about technical texts. First, the documentation attached to the products constitutes a part of it and, just as the defects of the product itself, may be subject to a complaint or a request for discount. Not many people are aware of that and exercise their rights on that basis but it is only a matter of time before it changes. In a word, soon the mess in instructions is likely to become quite an expense for the manufacturers who have not taken proper care of this process on time.

Secondly, errors in the documentation attached to machinery and devices may be a decisive argument in proceedings for compensation. The purpose of detailed safety instructions formulated in a thorough manner is to avoid such situations.

# 3 POLISH LANGUAGE IN DOCUMENTATION

## 3.1 Simple Syntax

Simple syntax consists of a subject, predicate and complement.

It is important to:

- Begin a sentence with the subject.
- Do not put insertions between the subject and the predicate.
- Use subordinate clauses or a few simple sentences instead of complex attributes.
- Avoid “flowery language”.
- Always follow the sequence of actions.

Complements should be used according to the following rules:

- Ordered by grammatical cases.
- Complements without prepositions are placed before the ones with prepositions.

In order to keep the meaning, the words that are described and their attributes should not be separated by insertions.

### 3.2 Verbs instead of Nouns

Verbs should be used instead of nouns:

Nouns	Verbs
<i>Możliwość zapoznania się.</i>	<i>Można zapoznać się.</i>
<i>Istnieje ryzyko poparzenia.</i>	<i>Można się poparzyć.</i>
<i>Prosimy o usunięcie.</i>	<i>Usunąć/usuń.</i>
<i>W celu załączenia i wyłączenia silnika.</i>	<i>Aby załączyć i wyłączyć silnik.</i>

### 3.3 Verbal Expressions

Verbs should be used instead of verbal expressions.

Verbal expressions	Verbs
<i>podjąć decyzję</i>	<i>zadecydować</i>
<i>wykonać badanie</i>	<i>zbadać</i>
<i>spowodować uszkodzenie</i>	<i>uszkodzić</i>
<i>poddać kontroli wzrokowej</i>	<i>obejrzeć</i>
<i>stworzyć środki zaradcze</i>	<i>zaradzić, rozwiązać</i>
<i>poddać kontroli</i>	<i>skontrolować</i>
<i>znaleźć zastosowanie</i>	<i>zastosować</i>
<i>dokonać uruchomienia</i>	<i>uruchomić</i>
<i>mieć zastosowanie</i>	<i>zastosować</i>
<i>przeprowadzić programowanie</i>	<i>zaprogramować</i>
<i>rozpocząć proces grzewczy</i>	<i>grzać, rozgrzać</i>

### 3.4 Passive Voice in Translation

In Polish passive voice is rarely used and is typical for written language – literature, journalism, and formal texts. Instead of passive voice impersonal forms are used, or the sentences are constructed with an inversion.

<b>Source</b>	<i>The machine was switched off by the user.</i>
<b>Incorrect translation</b>	<i>Maszyna została wyłączona przez użytkownika.</i>
<b>Correct translation</b>	<i>Użytkownik wyłączył maszynę.</i>
<b>Source</b>	<i>Die Maschine wurde geprüft.</i>
<b>Incorrect translation</b>	<i>Maszyna została sprawdzona.</i>
<b>Correct translation</b>	<i>Maszynę sprawdzono.</i>

There are plenty of impersonal forms in Polish which can replace the passive voice. They sound far more natural and therefore are more clear and easier to understand.

The most often used impersonal form is reflexive form, as reflexive form in third-person singular can create impersonal constructions with passive meaning, for instance:

- Maszynę zawsze dostarcza się z oprogramowaniem.
- Układ napełnia się płynem.

These are the forms appropriate for use in documentation.

Also, in Polish there are sentences without a subject, which in non-inflected languages are often expressed in the passive voice.

Sentences including modal defective verbs.	<i>Należy to zrobić. Wypada chyba zaczekać. Warto w to zainwestować. To mi się nie opłaca.</i>
Sentences including other defective verbs.	<i>Brakuje wody. Starczy jedzenia na trzy dni.</i>
Sentences with general subject.	<i>Na wołowej skórze by nie spisał. Jak okiem sięgnął.</i>
The sentences describing actions or states of a defined subject (in dative case) and emphasizing little dependence of the described events on its will, with a predicate in third person with the particle <i>się</i> .	<i>Lepiej mi się zrobiło po tym leku. Zachciało mu się jazdy. Zebrało jej się na płacz. Przyjemnie mi się czyta tę książkę.</i>
The sentences describing actions or states of a subject which is not clearly defined as well as orders and prohibitions relating to that subject, with a predicate in third person with the particle <i>się</i> .	<i>W tym miejscu uzbraja się maszynę. Rybę je się widelcem. Uprasza się o niepalenie. Powinno się uważać na to, co się mówi.</i>

The sentences describing actions or states of a subject which is not clearly defined, referring to the past, with a predicate including impersonal form with a suffix <i>-no</i> or <i>-to</i> .	<i>Rozbito szybę.</i> <i>Wylano fundament.</i> <i>Uruchomiono instalację.</i>
Modal sentences with nouns or adverbs acting as the predicate.	<i>Trzeba iść.</i> <i>Nie warto dyskutować.</i> <i>Nie wolno tego robić.</i> <i>Czas już wstawać.</i> <i>Pora iść.</i> <i>Strach pomyśleć.</i> <i>Niepodobna o tym zapomnieć.</i> <i>Brak mu było dobrego towarzystwa.</i>
Imperative sentences including an infinitive, often used in commands, orders, prohibitions, and provisions.	<i>Prać na sucho.</i> <i>Dokręcić do oporu.</i> <i>Założyć osłonę.</i>

### 3.5 Modal Verbs and Deontic Expressions

These verbs themselves do not inform about the action but only modulate the meaning of other verb that is in a form of an infinitive.

In Polish, we can distinguish three types of modality:

- Alethic modality – the closest to predication in terms of content.
- Deontic modality – the closest to imperative in terms of content.
- Epistemic modality – describing the reality hypothetically, similar to conditionals in terms of content.

Polish modal verbs include for example *chcieć*, *móc*, *musieć*, *woleć*, *powinien* (not always classified as a modal verb but has the same characteristics), *mieć*, *raczyć*, *potrafić* and others which require using an infinitive.

Deontic expressions are *wolno*, *trzeba* and *należy*.

In documentation, there will be used only the modal verbs that express an order, obligation, prohibition or permission (understood as something that should be done). The ambiguous modal verbs that mean possibility are avoided.

In sequences of actions modality should be avoided. Direct commands should be applied, e.g. instead of *musisz zrobić* it is better to use *zrób*.

**Note:** The verb *móc* in Polish can be used in all three types of modality, therefore in order to communicate unambiguous message it should be avoided in the instructions. Depending on the content, expressions *wolno* or *jest w stanie* etc. are used. The exception is the second level of warnings against hazards in safety instructions, where the word *może* means exactly *może*, *ale nie musi*.

### 3.6 Loan Translation

Loan translation is one of the most common mistakes in translation. Loan translation may appear in various language components – vocabulary, grammar, style, syntax or punctuation. Unfortunately,

most of the examples of loan translation, especially those referring to vocabulary, have become established in technical language and customers insist on using them, even though there are more appropriate Polish equivalents.

<b>Source</b>	<i>Blinded trial.</i>
<b>Incorrect translation</b>	<i>Badanie zaślepione.</i>
<b>Correct translation</b>	<i>Badanie z próbą ślepią.</i>

Loan translation – vocabulary

<b>Source</b>	<i>Your local service will be happy to assist you with any problems related to reusing, cleaning or disposing of SF6.</i>
<b>Incorrect translation</b>	<i>Lokalny serwis będzie szczęśliwy mogąc pomóc w każdym problemie związanym z ponownym użyciem, czyszczeniem i usuwaniem SF6.</i>
<b>Correct translation</b>	<i>Lokalny serwis może pomóc w każdym problemie związanym z ponownym użyciem, czyszczeniem i usuwaniem SF6.</i>

Loan translation – vocabulary and syntax

<b>Source</b>	<i>This company offers easy to use cost-effective products.</i>
<b>Incorrect translation</b>	<i>Ta firma oferuje łatwe w obsłudze i efektywne kosztowo produkty.</i>
<b>Correct translation</b>	<i>Ta firma oferuje produkty łatwe w obsłudze i efektywne kosztowo.</i>

Loan translation – syntax

<b>Source</b>	<i>Dies sorgt für Ihren prompten Überblick und eine größere Transparenz, erleichtert Ihre Bestellungen und bringt Lieferungen schneller auf den Weg.</i>
<b>Incorrect translation</b>	<i>Gwarantuje to Państwu błyskawiczne rozeznanie oraz większą przejrzystość, ułatwia realizację Państwa zamówień i zapewnia szybsze dostawy.</i>
<b>Correct translation</b>	<i>Gwarantuje to błyskawiczne rozeznanie oraz większą przejrzystość, ułatwia realizację zamówień i zapewnia szybsze dostawy.</i>

## 4 SUMMARY

Functional language constitutes a part of PN:EN 82079 which aims at implementing the standard of creating and maintaining technical documentation. It is not actually a language but a collection of guidelines and advice regarding syntax and style which can be applied to any modern natural language. Understanding these rules simplifies the process of translation because the translator does not have to think long which stylistic convention should be used – they can use ready-made patterns.

The documentation which is written or translated in accordance with these rules is easier to read and far more unambiguous. Therefore, applying the rules of functional language is helpful not only for the translator and the author of the documentation but also for the end user who can use it. Of course, not all authors follow these rules, as they are not widely known. Nevertheless, from the translator's

point of view these guidelines and recommendations should represent the ideal standards that should be pursued, even if it is impossible in practice.