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Article abstract

This article focuses on technical translation and the demands imposed on subject-field expert translators who must decide how they can reconcile the linguistic constraints imposed by a particular language with the communicative expectations found in a particular domain. Our main hypothesis is that experts typically resort to syntactic calquing to render phraseological units such as lexical collocations. By so doing they reinforce their role as language planners not only by introducing terminology into the TL but also by imposing SL norms within the expert community. Hence, the role of translation during the process of term documentation should be enhanced.

The Translator as ‘Language Planner’: Syntactic Calquing in an English-Spanish Technical Translation of Chemical Engineering

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RÉSUMÉ

Cet article porte sur la traduction technique ainsi que sur les conditions imposées aux experts exerçant des traductions et devant réconcilier les contraintes linguistiques d’une langue donnée avec les normes communicatives d’un certain champ spécialisé. Notre hypothèse est que les experts ont généralement recours au calque syntaxique afin d’exprimer des unités phraséologiques, dont les collocations lexicales. C’est ainsi que leur rôle de planificateurs linguistiques est renforcé, non seulement en introduisant de la terminologie dans la LA mais encore en imposant les normes de la LD à l’intérieur d’une communauté d’experts. C’est pour cette raison que le rôle de la traduction dans le processus de la documentation terminologique doit être mis en valeur.

ABSTRACT

This article focuses on technical translation and the demands imposed on subject-field expert translators who must decide how they can reconcile the linguistic constraints imposed by a particular language with the communicative expectations found in a particular domain. Our main hypothesis is that experts typically resort to syntactic calquing to render phraseological units such as lexical collocations. By so doing they reinforce their role as language planners not only by introducing terminology into the TL but also by imposing SL norms within the expert community. Hence, the role of translation during the process of term documentation should be enhanced.

MOTS-CLÉS/KEYWORDS

technical translation, syntactic calquing, term documentation, linguistic constraints, communicative expectations

1. Introduction

The purpose of this article is twofold: (a) to show that technical translation is not very different from translating, say, literature (Seleskovitch 1988), and (b) to argue that translation contributes to term formation in the Target Language (TL) by exploiting resources such as syntactic calquing. El-Shiyab (1999: 206-207) claims that whatever definitions of translation we come across, almost all of them can be subsumed under two definitions. The first is “the replacement of one written text from one language to another in which the main goal of the translator is meaning. The second is the transference of a message communicated from one text into a message communicated in another, with a high degree of attaining equivalence of context of

the message, components of the original text, and the semiotic elements of the text..." This second view seems to have more defendants these days, perhaps because of the enormous influence exerted by Discourse Analysis. Proponents of the first definition typically illustrate their claims with examples from technical translations where the transference of meaning seems paramount. In contrast, defendants of the second view claim that literary translation is a good example of their view since literary translation is mainly concerned with text functions. In this article, however, we offer an integrated approach by maintaining that technical translation should be not only concerned with transmitting meaning but also with the transference of communication in such aspects as, for example, following the terminological and phraseological conventions of the field in question. In other words, we agree with Sager (1992), who maintains that term formation is a conscious activity which uses pre-existing patterns and models, and with Galinski et al. (1993) who claim that to express the linguistic knowledge in technical texts, terminology (the group of terms characteristic of the subject matter) and LSP phraseology (the set of expressions and turns typical of the subject matter) are used. Consequently, linguistic knowledge and specific knowledge must go hand in hand. The Translated Text (TT), then, must be correct not only in its grammar but also in factors such as the loyalty of its contents with regard to the Source Text (ST), conceptual coherence, the degree to which it respects the receptor's stylistic conventions, and the communicative function. The notion of style here includes a range of elements, from the overall text structure to the selection of lexical elements at the sentence level, particularly terminology and phraseology (Cabr  1998; Wright, 1993).

2. Technical Translation

Our previous statement is in line with Seleskovitch's idea that "separate as they may be in the practice of individual translators, literary and technical translations have one aspect in common: they deal with texts, not only with languages" (Seleskovitch 1988: 83). This implies the use of co-text and extra-linguistic knowledge. Although different terms have been used (e.g. 'specialized translation,' 'scientific translation,' 'economic translation, etc.) we follow the current practice of using 'technical translation' to refer to the translation of LSP texts (Wright and Wright 1993). Technical translation is essentially a professional skill comprising, at the least, three basic requirements: (a) a clear comprehension of the source language, (b) knowledge of the subject, supported by access to reliable sources of the latest information, (c) and skills necessary to write on the discipline like an expert (Uvarov 1988; Wright & Wright 1993; Cabr  1998).

Technical translation is currently performed either by professional translators or by experts in the subject matter. A debate on the pros and cons of both types of translators has been going on for a long time. Fuertes Olivera (1998) has claimed that this debate should also consider practical matters such as 'money' (i.e., how much is the fee for the translation), since on many occasions this is the main factor in the choosing of an expert or a professional translator. In this article we investigate the translational activity of an expert in Chemical Engineering.

3. The Data

Our context of translation¹ embraces the translation of a university manual on Chemical Engineering, entitled *Equilibrium-Stage Separation Operations in Chemical Engineering* by Henley, E. J. and J. D. Seader. The translator is Dr. Fidel Mato Vázquez, a university professor in Chemical Engineering at the Universidad de Valladolid, widely acknowledged for his mastery in the translation of this type of text.² In this vein, Dr. Fernández-Polanco, Head of the Chemical Engineering Department, and a number of students in this programme defended the validity of the text and commented that, in their opinion, the translation was excellent because it adapted the English phraseological and terminological patterns to Spanish standards. In other words, if it was classified as a valid translation by the experts and receptors of the text we could conclude that the technical translator should have combined an adequate knowledge of the languages involved in translation, including the discursive style of LPSs, with specific cognitive competence in the subject to be translated (Cabré 1998: 46). It must be argued, then, that this translation must present a real and adequate terminology and phraseology (Cabré 1998: 33). In accordance with the reading literature, technical translations carried out by experts in the field offer fluency and conceptual coherence in the written discourse of the TL for three basic reasons: (i) knowledge of the specific subject, (ii) the understanding of its terminology and phraseology (given a sufficient linguistic competence in the working languages), and (iii) the ability to adjust to the communicative situation which is reflected in the context-conditioned variants of terminology and phraseology (Nkwenti-Azeh 1998: 160). Hence, the translator should have maintained the same didactic function of the ST in the TT.

This study was limited to 63 lexical collocations (Appendix 1). To investigate the influence of translators on language planning, we divided our corpus into two related sets: the English text and its translation. We, then, used the WordSmith concordancer to run a concordance search on five terms selected by experts at the Chemical Engineering Department, who considered them 'relevant' in this subject field: 'liquid,' 'vapor,' 'phase,' 'pressure' and 'equilibrium.'³ Example:

[1] English version: directing of the vapor flow to *propel the liquid* across the tray

[2] Spanish translation: dirigir el flujo de vapor de forma que *fuere el líquido a circular* a través del plato

4. Results and Discussion

LSP phraseology studies the phraseological units in specialized discourse. In LSP English, these units comprise a very limited group that can be divided into four categories: nominations (e.g. *malignant tumor*), irreversible binomials (e.g. *supply and demand*), collocations (e. g. *to induce an abortion*), and routine formulae (e.g. *approaching vessels please acknowledge*). Collocations are defined as habitual combinations of words, more or less fixed, whose meaning can be worked out from each component (Cowie 1994; Glässer 1994/95; Roberts 1994/5). Benson et al. (1993) classify them into grammatical and lexical collocations. The former consist of a dominant word (noun, adjective or verb) and a preposition, an infinitive or a clause. The latter consist of two 'equal' elements. According to its structure, they are currently separated into seven groups:

- L1: verb (usually transitive) + noun/pronoun (or prepositional phrase): e.g. *compose music*; *launch a missile*.
- L2: verb + noun: e.g. *demolish a house*; *annul a marriage*.
- L3: adjective + noun or noun (attributive) + noun: e.g. *strong tea*; *a chronic alcoholic*.
- L4: noun + verb indicating an action proper of the person or thing designated by the noun: e.g. *blood circulates*; *bees buzz*.
- L5: noun1 + of + noun2, indicating the measuring unit associated with noun2: e.g. *a pack of dogs*; *an act of violence*.
- L6: adverb + adjective: e.g. *strictly accurate*
- L7: verb + adverb: e.g. *appreciate sincerely*

In general terms, it is accepted that translating these units is difficult because they emerge out of the use that a given community is engaged in (Glässer 1994/95: 53), contribute to maintain the lexical cohesion of a text—also a very important element for translators (Rabadán 1996)—and imply the understanding of conceptual relations in the knowledge domain and its occurrences in the discourse depending on the communicative setting (Sager 1992: 109). In certain disciplines—for example, in Economics—these difficulties increase since the transfer of knowledge demanded at present by the general public makes it difficult, say, to draw a line between terms and common words (Holljen 1999).

Special languages are not only characterized by terms but also by phraseology, which may be as specific as terminology (Cabré 1998: 51). The existence of a relationship between terminology and phraseology is subject to debate. We follow Roberts (1994/95) and Pitch (1991) by accepting that LSP phraseology is a fundamental sub-discipline of terminology, which would explain our belief that translation of these units must be carried out considering both their linguistic implications and conceptual combinations. In other words, technical and literary translators face a similar dilemma: how can they reconcile the linguistic constraints imposed by a particular language with the expectations found in a particular domain? We should not forget that most terms gain currency and widespread use in the language in which they were produced. Many experts are familiar with them and, where possible, have adapted them to their native languages, at least in their informal conversations with colleagues. For example, the English term '*batch process*' is currently referred to by chemical engineers as '*proceso por batches*,' a Spanish adaptation.⁴ In other cases, experts continue using the foreign term, perhaps because of structural constraints which make the adaptation difficult. For example, Spanish chemical engineers use many English terms in their discussions. Some of these are '*stripping*,' '*piping*,' etc. These processes illustrate the use of a particular language as *lingua franca*, which in some cases seem to be in contradiction with nationalist language policies aimed at coining their own terms in every possible context. In the sci-tech environment, for example, less developed societies become receptors of different kinds of borrowings: cultural, scientific, technical and linguistic (Holljen, 1999; Alcaráz et al. 1998; Estevez, 1997; Kyjak et al. 1996; Godman et al. 1990; Neubert 1990). These societies, then, should rest on translators who, on many occasions, create neologisms or resort to different strategies to overcome the difficulties which would prevent them from transferring innovative contents from the ST to the TT (Goffin 1990). In our case, the expert translator guarantees fluency in the written discourse of the TT by making use of a rather polemical formula for translating the lexical collocations here considered: syntactic calquing.

Calquing is a method of linguistic borrowing. Sampson (1995) and Kyjak et al. (1996), for example, argue that calquing is very productive. Although there has been terminological and conceptual confusion around this term (Santoyo 1987), we argue that in the context of English-Spanish translation, calquing can be defined as linguistic elements, or groups of these which are used in Castillian Spanish through English influence, although the linguistic elements comprising this unit are recognized as Spanish (Pratt 1980). Calques can be divided into loan meanings and loan formations. Loan meanings consist in the semantic expansion of a given Spanish word to include a typical English meaning. These semantic borrowings are mainly due to cognation and paronym (Lorenzo 1996; Mwansoko 1991; Neubert 1990; Meunier-Crespo 1987). For example, the Spanish adjective '*dramático*' has taken the additional meaning of '*espectacular*' ('exciting' or 'impressive') because of the influence of the English adjective 'dramatic.' Loan formations or loan creations are foreign words with an outwardly Spanish appearance. In our case, they were adopted from English with little or no modification. Although most of them are not registered in dictionaries, Spanish speakers recognize them as part of the Spanish lexicon. They may be one-word formations (e.g. '*privacidad*' from 'privacy') or complex formations (Mwansoko 1991). The latter formations are called *syntactic calques* in this article. Basically they are loan translations adopted by one language from another either literally (e.g. '*terapia ocupacional*' from 'occupational therapy') or less literally (e.g. '*telón de acero*' from 'iron curtain') depending on the structural constraints imposed by the TL. In some cases, these complex formations create new complex terms in the SL because they usually designate conceptual innovations (Alcaraz et al 1998; Kyjak et al. 1996; Lorenzo 1996; Meunier-Crespo 1987; Santoyo 1987).

In the reading literature it is often assumed that calques are abundant in the Romance languages, particularly in technical fields (Santoyo 1987), perhaps because translators are more favorable to calquing than to pure anglicisms when borrowing since on many occasions they go unnoticed (Alcaraz et al. 1998; Calvi 1998; Molina 1997). This use of calquing is easily documented in the language of computers (e.g. '*formatear un disco*' from 'format a disk'), in the language of medicine and pharmacology (e.g. '*tratar una enfermedad con*' from 'treat a disease with'), and in the language of economics (e.g. '*crédito documentario*' from 'documentary credit') (Alcaraz et al 1998; Navarro 1995; Navarro et al 1994, 1992;; Ordoñez 1990; Meunier-Crespo 1987). To determine whether similar or different strategies were being used in the subject field of *Chemical Engineering*, we have embarked on a research project dealing with this specialized language variety. In this initial article, we have investigated the translation strategy used by the translator in question to render the 63 lexical collocations of the types L1, L2 and L4 identified under the nodes referred to above:

TABLE 1

Translation Strategies used for rendering English lexical collocations into Spanish.

| Translation Strategy | Number | % |
|-------------------------|--------|------|
| (i) Phraseological Unit | 56 | 88.9 |
| (ii) Paraphrase | 4 | 6.3 |
| (iii) Single lexeme | 1 | 1.6 |
| (iv) Missing | 2 | 3.2 |
| Total | 63 | 100 |

Source: Montero (1999)

In short, the translator relies on 4 possible strategies: (i) phraseological unit (PU), (ii) paraphrase (P), (iii) single lexeme (L), (iv) missing (M).⁵ Examples:

- [3a] PU: ‘enriquecer vapor’ from ‘to enrich vapor’
 ‘operar a presión’ from ‘to operate under pressure’
 ‘alcanzar el equilibrio’ from ‘to attain equilibrium’
- [3b] P: ‘forzar líquido a circular’ from ‘to propel liquid’
 ‘descender líquido en forma de lluvia’ from ‘to spray liquid’
- [3c] L: ‘desplazar el azeótropo’ from ‘to shift the equilibrium’
- [3d] M: ø from ‘for making contacts with liquid’

Although we are aware that our corpus is very limited, our data are rather promising because they are in line with similar research reported in the reading literature: technical translators resort to syntactic calquing for rendering complex terms. If the existence of this strategy were to be totally confirmed we might teach our translation students its importance in the translation of specialized texts. In addition, it might shed new light on the old debate about the role calquing plays in translation. On the one hand, language nationalists defending peculiarities and cultural identities claim that calquing only reflects the translator’s ignorance of the TL (Garcia Yebra 1995). Their arguments against this strategy may be summarised in the idea that different languages show structural and semantic divergences. Hence, calquing would be an artificial morpho-syntactic manipulation of the TL and evidence that different cultures risk losing their own identities due to the current process of globalization. Translation, therefore, would be just another feature of this process (Arntz 1988; Boulanger 1987; Klein-Lataud et al. 1986). On the other hand, globalists argue that calquing is positive because it favours innovation and development. They claim that technical translation involves innovation not only in content but also in form. It acts as a fertilizer to the communicative techniques of the TL, especially on terminology where translation seems better than artificial creation (Calvi 1998; Rajaspera 1996; Narayana 1994; Godman et al. 1990; Neubert 1990; Meunier-Crespo 1987; Santoyo 1987). This second view seems to hold more promise, and is in line with recent trends in translation research defending the use of corpus linguistics (Laviosa 1998). The analysis of real data might confirm not only the role of calquing as a terminology fertilizer, but also its contribution to the internationalization of terminologies (Santoyo 1987). Taking into consideration the conditioning elements of most translation processes—for example, time constraints, background knowledge, previous contact with new terms in the source language, etc.—we might conclude that the use of calquing is not only inevitable in technical translation but is also a form of language planning, although this dimension has never been officially acknowledged (Holljen 1999). In other words, we agree with Narayana (1994) that most of what we take as convergence has its origin in the translatorial actions taken by members of the speech community who use them as gap-filling devices in the terminological and phraseological context of the TL.

5. Conclusion

In this article we have shown that technical translation contributes to term formation and that technical translators should confront demands similar to those of literary

translators: they should be concerned not only with transmitting meaning but also with the transference of communication. In other words, technical and literary translators must decide how they can reconcile the linguistic constraints imposed by a particular language with the communicative expectations found in a particular domain. To illustrate these claims we have analyzed how a subject-field expert has rendered English lexical collocations of the types L1, L2 and L4 into Spanish. Our results confirm that these types of translators resort to syntactic calquing to render phraseological units, thus reinforcing their role as language planners not only by introducing terminology into the TL, but also by imposing SL norms within the expert community. Hence, two related questions need to be addressed: (i) can professional translators also act as language planners, in this case by suggesting more appropriate terms, linguistically speaking? (ii) is it possible to embark on a terminology project claiming that translations should not be considered reliable sources during the process of documentation? Corpus linguistics might provide the resources necessary to answer both questions. At this stage we suggest that calquing is inevitable because it reflects the present trend in favour of internationalization, promotes national languages, and contributes to homogenization among languages. And by so doing it favours semantic unity. In other words, calques maintain a link between a TL and international terminologies. In this situation, then, the subject-field expert translator—and his or her tendency towards calquing—acts as a language international planner.

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NOTES

1. Godman et al. (1990) claim that it is through the description of this context that we can give account for the decisions taken in the translation process, decisions such as the translation or non translation of a given text.
2. For example, in the *Industrial Engineering Chemistry Research* a reviewer comments that the "Spanish translation—by Mato Vázquez from Salamanca, coincidentally also the translator of the McCabe and Smith's *Unit Operations in Chemical Engineering* (1956, 1972)—was impeccable, down to preserving the secret dedication to Haugen in the preface and readapting the "on Wisconsin" message in the postface." This comment refers to *Transport Phenomena*, perhaps one of the most influential manuals in the last 35 years. Presently, it is in its 50th printing and has sold approximately 200,000 authorized copies. *INDUSTRIAL ENGINEERING CHEMISTRY RESEARCH*, 34-10, pp. 3183.
3. They yielded 973 concordances, 63 of which were, as we said before, classified as lexical collocations.
4. The Spanish word 'bache' means 'pothole,' 'air pocket,' 'bad time' or 'gap' (*Diccionario Oxford español-inglés/ inglés-español*).
5. 'Missing' corresponds to English lexical collocations which were not found in the Spanish version

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| Term | Collocation Type | Equivalent | Strat. |
|---------------|--|--|--------|
| <i>liquid</i> | L1 | | |
| 3. | directing of the vapor flow to <i>propel the liquid</i> across the tray (p. 55) | dirigir el flujo de vapor de forma que <i>fuere el líquido a circular</i> a través del plato (p. 58) | P |
| 34. | to <i>reboil the liquid</i> at the bottom of the column (p. 13) | <i>vaporizar el líquido</i> en el fondo de la columna (p. 12) | PU |
| 37. | the <i>liquid</i> being <i>held</i> on the tray (p. 49) | <i>manteniendo el líquido</i> sobre el plato (p. 52) | PU |
| 39. | for <i>making contacts with liquid</i> (p. 12) | | M |
| 144. | If this <i>liquid</i> is <i>revaporized</i> (p. 93) | Si este <i>líquido</i> se <i>revaporiza</i> (p. 100) | PU |
| 146. | <i>liquid</i> is <i>sprayed</i> downward (p. 75) | <i>el líquido</i> <i>desciende en forma de lluvia</i> (p. 81) | P |
| 154. | the <i>liquid</i> is <i>transferred</i> from tank to tank (p. 14) | <i>se transporta el líquido</i> de un tanque a otro (p. 14) | PU |
| 214. | to <i>hold liquid</i> on the tray (p. 55) | para <i>mantener el líquido</i> sobre el plato (p. 58) | PU |
| 215. | to <i>hold the liquid</i> on the tray (p. 49) | para <i>mantener el líquido</i> sobre el plato (p. 52) | PU |
| 307. | start <i>leaking liquid</i> through the gas orifices (p. 55) | comienza a <i>caer líquido</i> a través de los orificios de los platos (p. 58) | PU |
| | L2 | | |
| 329. | by <i>dispersing the liquid</i> (p. 53) | mediante <i>la dispersión del líquido</i> (p. 56) | PU |
| | L4 | | |
| 16. | where the <i>liquid</i> and vapor <i>flow</i> through the same openings (p. 68) | en los que <i>el líquido</i> y el vapor <i>fluyen</i> a través de los mismos orificios (p. 72) | PU |
| 33. | <i>liquid</i> at the bottom of the column <i>passes</i> through a reboiler (p. 12) | <i>el líquido</i> procedente del fondo de la columna <i>pasa</i> a un calderín (p. 12) | PU |
| 59. | one sees that the <i>liquid</i> <i>descends</i> through the downcomer (p. 68) | se observa que <i>el líquido</i> <i>baja</i> por el tubo de descenso (p. 72) | PU |
| 67. | <i>Liquid</i> <i>enters</i> the base of the cap through the slot (p. 71) | <i>El líquido</i> <i>entra</i> por la base de la caperuza a través de una ranura (p. 75) | PU |
| 125. | a cylindrical vessel (...) through which the gas or <i>liquid</i> <i>flows</i> (p. 16) | un tanque cilíndrico (...) a través del cual <i>fluye</i> el gas o <i>el líquido</i> (p. 14) | PU |
| 222. | Feed vapor <i>passes</i> up the column; feed <i>liquid</i> <i>passes</i> down (p. 12) | El vapor de la alimentación <i>pasa</i> hacia arriba en la columna mientras que <i>el líquido</i> <i>lo hace</i> hacia abajo (p. 11, 12) | P |
| 271. | with the <i>liquid</i> rapidly <i>spinning</i> about each coil (p. 62) | en ellas <i>el líquido</i> <i>se extiende</i> rápidamente <i>formando hilos</i> sobre cada hélice (p. 65) | P |
| 308. | there may be insufficient <i>liquid</i> to <i>wet</i> the surface (p. 53) | puede no haber suficiente <i>líquido</i> para <i>mojar</i> la superficie (p. 56) | PU |
| 324. | Will the <i>liquid</i> <i>wet</i> the packing? (p. 63) | ¿ <i>Mojará el líquido</i> al relleno? (p. 67) | PU |
| 328. | through the <i>liquid</i> , which <i>flows</i> in and around the packing (p. 49) | a través del <i>líquido</i> , que <i>fluye</i> por el interior y alrededor del relleno (p. 53) | PU |
| 330. | Correspondingly, <i>liquid</i> , while <i>flowing</i> to the botton (p. 12) | | M |
| <i>vapor</i> | L1 | | |
| 87. | If the <i>vapor</i> is then <i>condensed</i> (p. 138) | Si después se <i>condensa el vapor</i> (p. 149) | PU |
| 202. | <i>adding vapor</i> to or from a gas (p. 13) | <i>se adiciona vapor</i> hacia o desde un gas (p. 13) | PU |
| 209. | <i>Vapor</i> , (...), is increasingly <i>enriched</i> (p. 12) | <i>el vapor</i> (...) <i>se enriquece</i> progresivamente (p. 11) | PU |
| 210. | the <i>vapor</i> will be <i>superheated</i> (p. 179) | <i>el vapor</i> estará <i>sobrecalentado</i> (p. 194) | PU |

| Term | Collocation Type | Equivalent | Strat. |
|--------------------|--|--|--------|
| L2 | | | |
| 202. | <i>removing vapor</i> to or from a gas (p. 13) | <i>se retira vapor</i> hacia o desde un gas (p. 13) | PU |
| L4 | | | |
| 63. | <i>the vapor flowing</i> up the middle (p. 53) | mientras que <i>el vapor circula</i> por la parte central (p. 56) | PU |
| 91. | <i>the vapor leaving</i> the cap (p. 69) | <i>saliendo el vapor</i> de la caperuza (p. 75) | PU |
| 128. | <i>Feed vapor passes</i> up the column (p. 12) | El <i>vapor</i> de la alimentación <i>pasa</i> hacia arriba en la columna (p. 11) | PU |
| 194. | <i>vapor rising</i> through orifices (p. 68) | <i>el vapor</i> que <i>asciende</i> a través de los orificios (p. 72) | PU |
| <i>phase</i> L1 | | | |
| 18. | <i>without creating</i> a new <i>phase</i> (p. 90) | <i>sin crear una nueva fase</i> (p. 97) | PU |
| 21. | This second <i>phase</i> can be <i>created</i> by (p. 7) | Esta segunda <i>fase</i> se puede <i>generar</i> por medio de (p. 7) | PU |
| 88. | <i>the vapor phase</i> is <i>enriched</i> (p. 7) | la <i>fase</i> de vapor se <i>enriquece</i> (p. 11) | PU |
| 93. | <i>while the liquid phase</i> is <i>enriched</i> (p. 7) | mientras que la <i>fase</i> líquida se <i>enriquece</i> (p. 11) | PU |
| 104. | a second <i>phase</i> may be <i>created</i> by (p. 7) | se puede <i>generar una segunda fase</i> por (p. 7) | PU |
| 155. | the two <i>phases</i> <i>become</i> one phase (p. 107) | ambas <i>fases</i> se <i>transforman en</i> una sola (p. 115) | PU |
| L2 | | | |
| L4 | | | |
| 147. | a (...) <i>phase</i> that continuously <i>contacts</i> the other (p. 37) | una <i>fase</i> (...) que de forma continua <i>contacta</i> con la otra (p. 39) | PU |
| <i>pressure</i> L1 | | | |
| 4. | <i>throttled by valves</i> to <i>regulate</i> stage <i>pressure</i> (p. 26) | controladas por válvulas con el fin de <i>regular la presión</i> de la etapa (p. 26) | PU |
| 23. | <i>pressure</i> can be <i>calculated</i> as a function (p. 149) | se puede <i>calcular la presión</i> como una función (p. 161) | PU |
| 78. | <i>the pressure</i> is <i>fixed</i> (p. 91) | la <i>presión</i> está <i>fijada</i> (p. 98) | PU |
| 79. | If the <i>pressure</i> is <i>specified</i> (p. 90) | Si la <i>presión</i> está <i>especificada</i> (p. 43) | PU |
| 84. | <i>vapor pressure</i> may be <i>estimated</i> from (p. 158) | la <i>presión</i> de vapor se puede <i>estimar</i> a partir (p. 172) | PU |
| 85. | to <i>change pressure</i> (p. 3) | para <i>modificar la presión</i> (p. 3) | PU |
| 92. | <i>calculate</i> the vapor <i>pressure</i> of (p. 181) | <i>calcúlese la presión</i> de vapor del (p. 197) | PU |
| 102. | <i>operating under pressure</i> (p. 51) | que <i>opera a presión</i> (p. 54) | PU |
| 106. | the saturation <i>pressure</i> (...) can be <i>estimated</i> from (p. 158) | la <i>presión</i> de saturación (...) se puede <i>estimar</i> a partir de (p. 171) | PU |
| 122. | by <i>changing the pressure</i> (p. 101) | <i>modificando la presión</i> (p. 109) | PU |
| 127. | If we <i>raise the pressure</i> to E (p. 90) | Si se <i>aumenta la presión</i> hasta E (p. 97) | PU |
| 133. | Both (...) and total <i>pressure</i> will be <i>maintained</i> constant (p. 138) | Tanto (...) como la <i>presión</i> total <i>permanecerán</i> constantes (p. 148) | PU |

| Term | Collocation Type | Equivalent | Strat. |
|-----------------------|---|--|--------|
| L2 | | | |
| 5. | a second phase may be created by <i>reducing the pressure</i> (p. 7) | se puede generar una segunda fase por <i>reducción de la presión</i> (p. 7) | PU |
| 61. | partially vaporized by <i>reducing the pressure</i> (p. 7) | se vaporiza parcialmente por <i>reducción de la presión</i> (p. 11) | PU |
| 83. | desorption by partial <i>pressure lowering</i> (p. 16) | desorción por <i>disminución de la presión</i> parcial (p. 16) | PU |
| L4 | | | |
| 17. | an infinite negative value as <i>pressure approaches zero</i> (p. 142) | un valor infinito negativo cuando <i>la presión se aproxima a cero</i> (p. 153) | PU |
| <i>equilibrium</i> L1 | | | |
| 8. | The exit phase compositions <i>are in equilibrium</i> (p. 26) | Las composiciones de las fases a la salida <i>están en equilibrio</i> (p. 26) | PU |
| 12. | to <i>shift the equilibrium</i> by (p. 101) | desplazar el <i>azeótropo</i> modificando (p. 109) | L |
| 54. | there <i>are</i> two phases <i>in equilibrium</i> (p. 90) | <i>hay</i> dos fases <i>en equilibrio</i> (p. 97) | PU |
| 55. | true <i>equilibrium</i> is rarely <i>achieved</i> in practice (p. 117) | rara vez se <i>alcanza</i> en la práctica <i>el</i> verdadero <i>equilibrio</i> (p. 126) | PU |
| 57. | and if <i>equilibrium</i> is <i>attained</i> (p. 138) | Si (...) se <i>alcanza el equilibrio</i> (p. 148) | PU |
| 120. | a (...) mole fraction methane <i>is in equilibrium with</i> a liquid mixture (p. 181) | una (...) fracción molar de metano (...) <i>está en equilibrio con</i> una mezcla líquida (p. 196) | PU |
| 121. | a (...) fraction (...) <i>is in equilibrium with</i> (p. 180) | una fracción (...) <i>está en equilibrio con</i> (p. 181) | PU |
| 127. | it <i>is in equilibrium with</i> a vapor (p. 96) | <i>está en equilibrio con</i> un vapor (p. 104) | PU |
| L2 | | | |
| L4 | | | |
| 50. | when <i>equilibrium exists between</i> (p. 89) | cuando (...) <i>existe equilibrio</i> (p. 96) | PU |