10 WAYS TO IMPROVE YOUR TECHNICAL WRITING

Better technical writing can result in proposals that win contracts, advertisements that sell products, instruction manuals that technicians can follow, and letters, memos, and reports that get your message across to the reader. Here are ten tips on style and word choice that can make writing clear and persuasive:

- Know your reader – Are you writing for engineers? managers? technicians? lay people? Make the technical depth of your writing compatible with the background of your reader.
- Write in a clear, conversational style--Naturally, a technical paper on sizing pumps shouldn't have the same chatty tone as a personal letter. But most technical professionals lean too much in the other direction, and their sharp thinking is obscured by windy, overly-formal prose.

The key to success in technical writing? Keep it simple. Write to express--not to impress. A relaxed, conversational style can add vigor and clarity to your work.

FORMAL TECHNICAL STYLE	INFORMAL CONVERSATIONAL STYLE
The data provided by direct examination of samples under the lens of the microscope are insufficient for the purpose of making a proper identification of the components of the substance.	We can't tell what it is made of by looking at it under the microscope.
We have found during conversations with customers that even the most experienced of extruder specialists have a tendency to avoid the extrusion of silicone profiles or hoses.	Our customers tell us that experienced extruder specialists avoid extruding silicone profiles or hoses.
The corporation terminated the employment of Mr. Joseph Smith.	Joe was fired.

- Be concise--Technical professionals, especially those in industry, are busy people. Make your writing less time-consuming for them to read by telling the whole story in the fewest possible words.

How can you make your writing more concise? One way is to avoid redundancies--a needless form of wordiness in which a modifier repeats an idea already contained within the word being modified. For example, a recent trade ad described a product as a "new innovation." Could there be such a thing as an old innovation? The ad also said the product was "very unique." Unique means "one of a kind," so it is impossible for anything to be very unique.

By now, you probably get the picture. Some other redundancies that have come up in technical literature are listed below, along with the correct way to rewrite them:

REDUNDANCY	REWRITE AS
advance plan	plan
actual experience	experience
two cubic feet in volume	two cubic feet
cylindrical in shape	cylindrical
uniformly homogeneous	homogeneous

Many technical writers are fond of overblown expressions such as "the fact that," "it is well known that," and "it is the purpose of this writer to show that." These take up space but add little to meaning or clarity. The following list

includes some of the wordy phrases that appear frequently in technical literature. The column on the right offers suggested substitute words:

WORDY PHRASE	SUGGESTED SUBSTITUTE
during the course of	during
in the form of	as
in many cases	often
in the event of	if
exhibits the ability to	can

- Be consistent – “A foolish consistency," wrote Ralph Waldo Emerson, "is the hobgoblin of little minds." This may be so. But, on the other hand, inconsistencies in technical writing will confuse your readers and convince them that your scientific work and reasoning are as sloppy and disorganized as your prose.

Good technical writers strive for consistency in the use of numbers, hyphens, units of measure, punctuation, equations, grammar, symbols, capitalization, technical terms and abbreviations. For example, many writers are inconsistent in the use of hyphens. The rule is: two words that form an adjective are hyphenated. Thus, write: first-order reaction, fluidized-bed combustion, high-sulfur coal, space-time continuum.

The U.S. Government Printing Office Style Manual (1), Strunk and White's "The Elements of Style" (2), and your organization's writing manual can guide you in the basics of grammar, punctuation, abbreviation and capitalization.

- Use jargon sparingly--Chemical engineering has a special language all its own. Technical terms are a helpful shorthand when you're communicating within the profession, but they may confuse readers who do not have your special background.

Take the word "yield," for example. To a chemical engineer, yield is a measure of how much product a reaction produces. But, to car drivers, yield means slowing down (and stopping, if necessary) at an intersection. Other words that have special meaning to chemical engineers but have a different definition in everyday use include: vacuum, pressure, batch, bypass, recycle, concentration, mole, purge, saturation, catalyst. Use legitimate technical terms when they communicate your ideas precisely, but avoid using jargon just because the words sound impressive. Do not write that material is "gravimetrically conveyed" when it is simply dumped.

- Avoid big words--Technical writers sometimes prefer to use big, important-sounding words instead of short, simple words. This is a mistake; fancy language just frustrates the reader. Write in plain, ordinary English and your readers will love you for it.

Here are a few big words that occur frequently in technical literature; the column on the right presents a shorter--and preferable--substitution:

BIG WORD	SUBSTITUTION
terminate	end
utilize	use
incombustible	fireproof
substantiate	prove
optimum	best

- Prefer the specific to the general--Technical readers are interested in detailed technical information--facts, figures, conclusions, recommendations. Do not be content to say something is good, bad, fast or slow when you can say how good, how bad, how fast or how slow. Be specific whenever possible.

GENERAL	SPECIFIC
a tall spray dryer	a 40-foot-tall spray dryer
plant	oil refinery
unit	evaporator
unfavorable weather conditions	rain
structural degradation	a leaky roof
high performance	95% efficiency

- Break the writing up into short sections--Long, unbroken blocks of text are stumbling blocks that intimidate and bore readers. Breaking your writing up into short sections and short paragraphs – as in this article – makes it easier to read.

In the same way, short sentences are easier to grasp than long ones. A good guide for keeping sentence length under control is to write sentences that can be spoken aloud without losing your breath (do not take a deep breath before doing this test).

- Use visuals--Drawings, graphs and other visuals can reinforce your text. In fact, pictures often communicate better than words; we remember 10% of what we read, but 30% of what we see. Visuals can make your technical communications more effective. The different types of visuals and what they can show are listed below:

TYPE OF VISUAL	THIS SHOWS...
Photograph or illustration	...what something looks like
Map	...how it is put together
Schematic diagram	...how it works or is organized
Graph	...how much there is (quantity); how one thing varies as a function of another
Pie chart	...proportions and percentages
Bar chart	...comparisons between quantities
Table	...a body of related data
Mass and energy balances	...what goes in and what comes out

- Use the active voice – In the active voice, action is expressed directly: "John performed the experiment." In the passive voice, the action is indirect: "The experiment was performed by John."

When possible, use the active voice. Your writing will be more direct and vigorous; your sentences, more concise. As you can see in the samples below, the passive voice seems puny and stiff by comparison:

PASSIVE VOICE	ACTIVE VOICE
Control of the bearing-oil supply is provided by the shutoff valves.	Shutoff valves control the bearing-oil supply.
Leaking of the seals is prevented by the use of O-rings.	O-rings keep the seals from leaking.
Fuel-cost savings were realized through the installation of thermal insulation.	The installation of thermal insulation cut fuel costs.