



accurately read by the computer. In some respects, this resumé will look like the resúmes prepared before computers and word processing programs came into common use, when resúmes were typed on a simple single-font typewriter.

There are three ways of handling scannable resúmes:

1. The resumé is scanned into the computer and maintained as a graphic image; when this is done, a traditional resumé may be sent.

2. The resumé is scanned into the computer and the graphics are converted to text (this is the main topic of this article).

3. The resumé is scanned and converted to text and then a cover page summarizing the qualifications is generated. This requires someone to read the resumé and develop the cover page, which is normally done by an outside service.

**E-mail resumé.** This is a specialized form of the scannable resumé. It is sent as an ASCII text file, and it has even less formatting than a scannable resumé. It will always use a fixed-width font and no special styling effects, such as boldface type or underlining.

An e-mail resumé will be fed directly into the computer database that stores the resúmes. This provides the most accurate translation of information. Only a few companies use this type of resumé, and those that do will indicate that they want the resumé in this form.

**Web resumé.** This is a resumé that is published on the Web. It is designed to be identified by search engines so that employers can find out more about your qualifications.

This type of resumé is typically not very effective in finding a job, as most companies do not conduct searches on the Web for potential employees. Thus, it should be viewed as only one more tool in your job-seeking toolbox. It may, though, be effective in selling yourself if you are working for another company or possibly as a consultant. You can direct people to your

resumé, but do not expect them to find it on their own.

### General resumé content

The general layout and content will be the same for both a traditional resumé and a scannable resumé. In addition, many aspects of your resumé will be the same whether you have 20 years of experience or are a new graduate, although experienced engineers and new grads will emphasize different things.

Every resumé should have the following sections:

- personal contact information;
- career objective (optional);
- summary of qualifications (only for experienced engineers);
- education; and
- experience.

There are two different styles of resúmes: chronological and functional.

The chronological resumé lists your experience in order, with the most recent first and working back in time. This is the typical style used by most new graduates.

The functional resumé groups all your experience into functions or types of experience. This is especially useful for the experienced engineer whose career has spanned many jobs. The functional resumé will normally have a summary of qualifications.

### A resumé for an experienced engineer

For an experienced job-seeker, a traditional resumé of two pages is acceptable and is, indeed, now the norm. Generally, a traditional resumé should not exceed two pages. Some sources indicate that a scannable resumé can be longer — as long as four pages — but this is not recommended. Remember that eventually someone will read it, and no one wants to read a four-page resumé.

A typical layout for an experienced engineer's resumé includes the following, generally in this order:

**Personal contact information.** Your name should be the first item on the resumé on a separate line of its

own, and it should appear at the top of each page of the resumé (for example, as a header). Then, provide your address and telephone number. You should have an answering machine or voice mail service at the number listed so that messages can be left if you are not available. It is now acceptable, and encouraged, to include an e-mail address, if you have one.

**Objective.** Use an objective only used when it adds to the resumé. If your objective is broad, such as "to obtain a challenging position using my chemical engineering skills," then it should be left off. However, if it allows the company to find a match between your desires and the requirements of the job, then you should include it. The objective is especially important if you are making a career change.

**Summary of qualifications.** This optional section is especially useful for tying together the commonalities of a number of different jobs. It makes your resumé somewhat of a hybrid between a functional resumé and a chronological resumé. The equivalent for a graduating engineer is a skills section (discussed later).

**Experience.** Experience should be listed next, with the most recent at the top working back toward your earlier jobs. You should provide details about the work and describe what you accomplished instead of just listing job titles, since different job titles have different meanings in different companies.

Concentrate on the details that are relevant to the position you are applying for — remember, much experience transfers from one field to another. (For example, supervisory experience in a restaurant is good even though it is not in a technical field.) Whenever possible, list concrete, quantifiable accomplishments, such as "saved \$10 million" or "completed project two weeks ahead of schedule."

**Education.** List your education next, with the most recent at the top. Include your major, degree, school or university, and when the degree was awarded. If your grade point average

is above 3.0, include it, along with the basis for it (e.g., 3.5/4.0).

**Awards, honors, affiliations, and certifications.** This information comes next and should include any significant awards and honors, as well as any elected offices or volunteer positions you hold in technical or professional societies. You can omit this section if you are tight on space or have little to say.

**Publications.** You generally should not list publications on your resumé. It is acceptable to attach to the resumé a separate page listing your publications, but do not include this information on the resumé itself. If you have a small number of publications (one to three) in prestigious refereed journals, then you could consider including them.

**Keywords section.** This is not recommended. The keywords should be incorporated into the experience section. A mere listing of a large number of words does not make for pleasant reading.

**References.** You should not include a list of references on your resumé. Rather, provide them as necessary when you are asked to do so. Furthermore, do not say "References available on request," since it is assumed that all job-seekers will provide references.

**Citizenship.** Indicate your citizenship or residence status if there is a question about your right to work in the United States. You can also make a note of this in your cover letter.

### A new engineer's resumé

A recent graduate typically has a one-page resumé; there is generally no reason to go to two pages. A scannable resumé may be longer if necessary, but should not exceed two pages.

The overall format for a recent graduate is similar to that for an experienced engineer; so, only the noteworthy differences are discussed here.

**Objective.** Most recent graduates may not have a clear objective. An overly broad and general objective

should not be used. It is better to remove this section than to include a vague and meaningless objective.

**Skills.** Use this section to highlight any specific skills that you may have. This section is often used by experienced engineers to summarize their related skills from many diverse job assignments.

It is not recommended that chemical engineering graduates list computer skills unless you know the employer is looking for something very specific. For example, you could list process simulation experience if you know the company is looking for that. You should not list typical computer software such as spreadsheets, word processors, and so on. Companies assume you can learn these packages if you do not know them.

**Experience.** A recent graduate may have little or no engineering experience. Experience directly related to chemical engineering is best, but don't discount other jobs you may have held. Any experience that shows your ability to work with people or to supervise others is worth listing even if it is not directly related to the chemical field.

### The scanning process

To understand why scannable resúmes should be prepared according to certain specifications, it is important to understand the resumé scanning process.

When a resumé is received, it is scanned into a computer system and a graphic image is produced.

This graphic image is not useful, so it is run through an optical character recognition (OCR) process. This process translates the graphic image into characters. The graphics are matched to characteristics of known fonts to determine which character is present. This character is substituted in the document in place of the graphics. The result is an ASCII document with no special formatting (e.g., bold or underlining). Any character that the OCR software cannot recognize is assumed to be a graphic, and it is ignored and not placed into the file.

The ASCII file of the resumé is then stored in a database or other file. There is normally *no* human intervention between scanning and putting the resumé into a file. Thus, any inaccuracies in scanning are not caught and corrected.

Once resúmes have been stored in the computer, then keyword searches are performed on the resúmes to look for certain qualifications. Since keyword searches look for exact matches, misspelled words are not matched.

### Scannable resumé formatting

When writing a resumé that will be scanned, some of the old rules no longer apply. Not only is the type style different, but the wording is also different than a traditional resumé to accommodate the scanning for keywords.

And, unlike a traditional resumé, fancy fonts and formatting should not be used on a scannable resumé. This means that a scannable resumé will look plain and ordinary compared to a traditional resumé.

**Type font and size.** The scannable resumé should use one of the standard, classical typefaces, such as Arial or Times Roman. The sans serif fonts (e.g., Arial) are more accurately processed by the OCR process than the serif fonts (e.g., Times Roman). (Serif fonts, such as this one [Times], have short nibs at the ends of letters. Sans serif fonts, such as this [Universe], do not.) However, Times Roman has become so standard that most OCR programs will do a good job of recognizing it.

The type size is more important in a scannable resumé than a traditional resumé. In a traditional resumé, 10-point type is the minimum, but other sizes are acceptable. In a scannable resumé, the type should be 10 or 12 point. While you can use odd point sizes, such as 11 point, on a traditional resumé, you should not do this on a scannable resumé. This is because the OCR programs normally do better interpreting standard, even point sizes.

Do *not* use multiple font sizes for scannable resúmes. Even though the characters may be recognized correct-

ly, the formatting will probably not be correct, so your scanned resumé will not look good.

**Underlining.** In a traditional resumé, some underlining, especially for titles, is acceptable and makes the resumé easier to read. On a scannable resumé, underlining should *never* be used. The OCR process cannot distinguish between the underline and part of a character. Thus, either the wrong character may be used or the character may be interpreted as a graphic and ignored.

In addition to eliminating the underlining, decorative lines should not be used on a scannable resumé. The lines will not normally cause problems with the OCR process or keep words from being recognized, but they will not show up on the scanned resumé. Thus, if you are depending on lines to improve the look of the resumé, they will not appear.

**Boldface type.** Boldface type is acceptable to most OCR systems, but not all. If you are unsure, then you should not use bold. It would probably not add much to the resumé anyway. The OCR process does not distinguish between bold and non-bold type, so everything will be non-bold when the resumé is viewed on the computer system after it has been through the OCR process.

**Spacing.** Letter spacing should be whatever is standard for the font you are using. Do not try to squeeze more on the page by condensing the type closer together. The key is to provide sufficient white space between the characters to allow for accurate character recognition.

Use standard line spacing. Don't add extra space between lines or decrease the space between lines. On a traditional resumé, you might use a half-line space between paragraphs or bullet items, but don't do this on a scannable resumé. The OCR system wants even, full line spacing — fractional spacing may result in uneven lines on your resumé or may cause lines to be missed. If you want extra space between topics, use full lines,

which will not cause problems with the OCR process.

**Justification and columns.** The resumé should always be aligned to the left, including titles. (Your name and address may be centered at the top.) You should never justify (that is, make both margins flush), since this modifies the spacing between the characters. It provides a nice typeset look, but it makes the OCR process less accurate. The OCR software identifies letters based on the normal spacing between characters. Spacing different from this confuses the OCR software and the character recognition is not accurate.

Two-column format should never be used. The OCR program cannot

handle multiple columns and will take the text on one line from both columns and put them together as a single line. This will then effectively scramble your resumé and make it unreadable.

**Type quality.** The quality of the type in a scannable resumé is more important than in a traditional resumé. The reader's reaction to your traditional resumé depends in part on the resumé's type quality. For a traditional resumé, laser printer or high-quality ink-jet printer type is recommended, but near-letter-quality dot matrix type is often acceptable. This is not true for a scannable resumé. Near-letter-quality type may not be recognized correctly. You should always use a high-quality laser or ink-jet printer.

**Table 1. Dos and don'ts for traditional resúmes and scannable resúmes.**

	Traditional Resumé	Scannable Resumé
Maximum Length, Recent Graduate	1 page	1 page
Maximum Length, Experienced Engineer	2 pages	2 pages
Font	No restrictions (other than good taste)	Common fonts, such as Times Roman, Arial, or MS Sans Serif
Multiple Fonts	No more than 2	No
Type Size	10 point or larger	10 or 12 point
Odd Type Sizes	Acceptable	No
Multiple Type Sizes	Acceptable	No
Boldface Type	Acceptable	Avoid
Underlining	Acceptable	No
Italics	Not recommended	No
Paper Color	White or cream	White only
Paper Type	Bond or high-linen	Plain, no linen or watermark
Bullets	Yes	No; instead use asterisks (*) or hyphens (-)
Multi-Column Format	Acceptable	No
Justification	Any	Left only
Graphics	Not normally used	No
Name on Each Page	Yes	Yes
Staple Pages Together	Acceptable	No
Print on Two Sides of Page	Not recommended	No

**Paper.** Paper selection is important for both traditional and scannable resu-més. For a traditional resu-mé, you should use a good-quality bond paper in white or cream.

For a scannable resu-mé, it is im-portant to obtain a good contrast be-tween the paper and the type on the paper. For this reason, only a good-quality white paper should be used. Furthermore, don't use paper with watermarks or textured paper, such as with high linen content. These pro-vide varying backgrounds for the scanner that may be interpreted as characters or interfere with the correct scanning of your resu-mé.

Use 20-lb to 24-lb paper. The heavier paper will ensure better feed-ing through the scanner without dou-ble feeding of stuck-together pages. But, too heavy a paper may jam the scanner.

**Printing.** Print your resu-mé on one side of the paper only. Two problems occur with two-sided printing.

Characters can bleed from one side to the other, producing stray marks that result in inaccurate character recognition. Bleeding happens with lighter-weight paper and can be miti-gated by using heavy-weight paper, but it's better to avoid it altogether by printing on only one side of the paper.

The second problem with two-sided printing is that when a resu-mé is fed into the scanner's sheet feeder, only one side is scanned. So, if your resu-mé is printed on both sides of the paper, half of it will be missed.

**Keywords**

One of the main reasons that com-panies scan resu-més is so that they can conduct quick keyword searches to screen resu-més to identify potential candidates. Companies will search on multiple keywords and then select the resu-més with hits on the largest num-ber of different keywords. Because of this, it is important to incorporate as many good keywords into your resu-mé as possible to increase the num-ber of hits. Identify the keywords that the company may be looking for, and

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**OBJECTIVE**  
To obtain a position in a manufacturing environment with responsibilities for advanced process control.

**SUMMARY OF QUALIFICATIONS**  
\* Process Control Engineer on a hydrocracker advanced control project. Responsibilities included control system design and implementation.  
\* Experienced in multi-variable process control and model predictive control algorithms, including DMC and RMPC.  
\* Project Engineer and Control Systems Engineer for reinstrumentation project on a Distillation Unit.  
\* Process Engineer in charge of multiple units, including hydrocracker, fluid catalytic cracker, catalytic reformer, alkylation, and distilling.  
\* Project Engineer on a \$2.0 MM operator training simulator for a catalytic cracking unit. The simulator reduced startup time by 3 weeks and saved \$10.0 MM.  
\* Process Engineer in charge of large steam boilers and 4,000-gpm demineralizers.  
\* Developed AspenPlus model of hydrotreating unit, which allowed optimization and savings of \$1 MM/year in operating costs.

**EXPERIENCE**  
\* May 1992 - Present  
Staff Engineer - ABC Oil Company  
\* June 1988 - May 1992  
Process Control Engineer - ABC Oil Company  
\* June 1982 - January 1988  
Engineer - OILCo Refining Company

**EDUCATION**  
MS Chemical Engineering - May 1982  
Louisiana Institute of Technology  
BS Chemical Engineering - May 1980  
University of Arcadia

**CERTIFICATIONS AND MEMBERSHIPS**  
\* Registered Professional Engineer in Texas and Louisiana  
\* Member of American Institute of Chemical Engineers  
\* Past Chair of AIChE Professional Development Committee

■ *Figure 1. A scannable resu-mé should use a classical font, standard spacing, and no fancy formatting.*

then work as many of them as possible into your experience or skills sections.

You need not send the same resu-mé to every company. You can have different resu-més with different key-words that emphasize different skills and areas of expertise to send to dif-ferent employers. Target your resu-mé to the positions that the company is looking to fill.

For keyword searches, the key-words are normally nouns; verbs are seldom searched for. When phrasing your resu-mé, start thinking in terms of nouns that describe your experience. This is different from the traditional resu-mé, where the emphasis was on action verbs.

For example, a traditional resu-mé might have included:

- Managed a department of 20 process design engineers.
- Designed and constructed grass-roots petroleum refinery.

For a noun-oriented scannable resu-mé, this experience could be re-warded as:

- Manager of a 20-person process design department.
- Project Engineer for grassroots petroleum refinery.

Use industry jargon. Remember that your potential employer will search for things that are applicable to its industry. For example, if a company is looking for a process control engineer in a refin-

ery, it might search for such keywords as: process control, process engineer, hydrocracker, coker, alkylation, catalytic reforming, instrumentation, etc.

In addition to the industry jargon, you can include other keywords to indicate your willingness to travel, language skills, special skills, and so on.

A section of keywords is not recommended. It is better to work the keywords into your experience. Adding a large section of keywords may increase the number of hits on your resumé, but may have unwanted side effects: Many people do not like the look of such a section. It may give the impression that you are just trying to improve your chances and don't have any real substance. Re-

member, after your resumé is selected, someone will read it, and that individual must decide if you should be interviewed. Finally, it takes room away from other areas that could be better used to describe your experience. In time, as resumé scanning becomes more common, keyword sections may become more accepted.

### Proofreading your resumé

Proofreading your resumé is critical whether you are sending a traditional resumé or a scannable resumé. Your resumé is the first impression someone will have of you, and you want it to be a good one.

Make sure you check your resumé for spelling and grammar. Remember that the computer spell-checker only checks to see that the word you used is in its list of known words and not that you used the correct word.

It's a good idea to have someone else read your resumé to see if it makes sense. Also, it's easy to overlook errors in your own work, but a fresh set of eyes may spot them.

In addition, if you are creating a scannable resumé, take your resumé to someone who has a scanner, run it through the scanner and OCR process, and look at the results. You can then see how your resumé will look to a potential employer.

### Sending the resumé

**Cover letter.** It is important to include a good cover letter with your resumé. This allows you to expand on any points in your resumé that are particularly relevant to the employer, as well as explain any "questionable items," such as gaps in your employment history. Cover letters are often scanned along with the resumé and treated as part of the resumé for the screening process.

The cover letter should be addressed to a specific person with their exact title. If you don't know who this is, call the company or check its Web site.

**Mechanics.** Always send originals. Photocopies may have imperfections that may interfere with the OCR process.

Do not fold the resumé. Send it in a 9-in.-by-12-in. envelope. In addition, it's a good idea to put a light sheet of cardboard on each side of the resumé to keep it from getting wrinkled. Folds or wrinkles in the resumé may cause shadows on the scanner and may cause the OCR process to miss lines of text that are right next to the fold.

Never staple the resumé. When the staple is removed, the paper may be torn or mutilated. This may cause the paper to stick together so that only one of the pages is scanned, or to jam in the scanner's automatic feeder. **CEP**

### Further Reading

**Kennedy, J. L., and T. J. Morrow,** "Electronic Resumé Revolution," John Wiley and Sons, New York (1995).

"Preparing the Ideal Scannable Resumé," Resumix, Inc., Sunnyvale, CA, available via [http://www.resumix.com/resume/resume\\_tips.html](http://www.resumix.com/resume/resume_tips.html).

"The Online Job Application: Preparing Your Resumé for the Internet," The Riley Guide, available via <http://www.dbm.com/jobguide/eresume.html>.

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### AIChE's Career Assistance Programs

The Professional Development Committee of AIChE, at each National and Annual Meeting, provides several career assistance services targeted at locating a job:

- Job Search Strategies Workshop — explores how to plan and conduct an effective job search; it is suitable for engineers looking for a new position internally or externally.
- Cover Letter Workshop — discusses the preparation of the transmittal letter and covers the purpose of the letter, how to write it, and some important "dos" and "don'ts."
- Interviewing Tips Workshop — covers the "art of interviewing," including how to make a good impression, key questions to ask, and other pertinent issues.
- Managing Your Career Workshop — explores how to manage your career in today's dynamic business climate and take full advantage of the opportunities presented to you.
- Resumé Round Table — provides a chance for chemical engineers to get feedback on their resúmes from several experienced engineers.
- Peer Help Employment Center — enables participants to sit one-on-one with an experienced engineer to discuss their resumé, or to ask questions about job-search strategies, career directions, or other related issues.

AIChE's Career Services Dept. offers career and employment services to support chemical engineers in managing their careers, employers in recruiting and developing chemical engineering professionals, and students in career planning. Career workshops, job fairs, and Web-based products are examples of services aimed at these audiences. For information, call 212/705-7670, e-mail [careerservices@aiche.org](mailto:careerservices@aiche.org), or visit AIChE's Web site at <http://www.aiche.org>.