

## Anatomy of a Quote

While engineering schools still go a very good job of teaching the science behind chemical engineering, they do little to prepare an engineer for industrial business practices. If you're in the field and assigned to a project that requires you to evaluate the cost of an upgrade or repair, how do you go about preparing such information? One of the key pieces of such a puzzle is equipment quotations. The process of getting accurate equipment prices starts with the process engineer specifying the equipment. While most chemical engineers learn how to design many pieces of the equipment used in chemical processing, the truth is that engineers working the plant itself do not design the equipment very often. Typically, that task is either left up to vendors, consultants, or contractors. For example, if a process engineer is working on a project that will require a shell and tube heat exchanger, the process engineer will typically complete a specification sheet that includes flow rates, temperatures, pressures, allowable pressure drops, physical properties, and material of construction. The process engineer seldom asks for a quotation for a shell and tube heat exchanger with 110 3/4" tubes on a rotated square pitch with 12 segmented baffles on the shell side. Now, that's not to say that some engineers do not do this, but it's does not happen as often as you might think.

Once the specification has been prepared, it will be forwarded directly to manufacturers or to manufacturers representatives. Manufacturers are often utilized to help prepare the specification as well. To carry on with our shell and tube example, let's consider a condenser to be used to condense ammonia by using cool brine. After the specification is completed, the manufacturer (or manufacturers) will reply with a quotation, their terms and conditions of sale, and a TEMA specification sheet.

Let's begin by examining the quotation page:

**XYZ EQUIPMENT**

2830 Providence Creek Road, Richmond VA. 23236

DATE: February 23, 2002

|                      |                     |                     |                              |
|----------------------|---------------------|---------------------|------------------------------|
| <b>To:</b>           | Mr. Bob Johnson     | <b>From:</b>        | Mr. Stan Ubetterbuy          |
| <b>Company:</b>      | ABC Chemical        | <b>Phone #:</b>     | (555) 555-1111               |
| <b>Phone #:</b>      | (555) 555-1234      | <b>Fax #:</b>       | (555) 555-2222               |
| <b>Fax #:</b>        | (555) 555-6789      | <b>E-Mail:</b>      | xyzequipment@email.com       |
| <b>Subject:</b>      | Equipment Quotation | <b>Pages:</b>       | _____ (including cover page) |
| <b>Your Ref. No.</b> | 2586354             | <b>Our Ref. No.</b> | 14526-985                    |

Dear Johnson:

XYZ Equipment is pleased to offer our proposal for a shell and tube heat transfer solution to the requirements of the above referenced inquiry. Please note that our quotation is being made in accordance with our attached General Terms & Conditions of Sale.

**Item: E-101**

One (1) TEMA Class CES Shell and Tube Heat Exchanger with a heat transfer area of 304.0 ft<sup>2</sup>. The unit consists of 80 tubes with an outside diameter of 1 inch. Tubes are bimetallic with steel on the outside and cupro-nickel inside. The heat exchanger is arranged for single pass flow on the shell side and four (4) pass flow on the tubeside. Unit includes an ASME U code stamp.

**Price for one (1) unit.....\$ 16,500**  
**3 Coat Paint System for Corrosive Environments Adder.....\$ 1,200**

**Shipment Terms:** *FOB Factory, Freight Collect*  
**Shipment Point:** *Houston, TX*  
**Shipment:** *8-10 weeks after receipt of order or drawing approval, if required*  
**Terms of Payment:** *15% with purchase order, Net 30 days*  
*35% with certified drawings, Net 30 days*  
*50% (Balance) upon shipment, Net 30 days*  
**Taxes:** *Pricing does not include any applicable state, local, or other taxes*  
**Validity:** *This proposal is valid for 30 days.*

Thank you for the opportunity to provide this proposal for your consideration. If you should have any questions regarding this proposal, or require any additional information, please feel free to contact me directly at the numbers shown above.

Sincerely,

Mr. Stan Ubetterbuy  
Applications Engineer  
XYZ Equipment Corporation

cc: Mr. Tom Johnson – Shell and Tubes for You, Inc.

As you can see, transmission information is at the top of the page followed by a brief introduction. Technical comments may also be included in this area. **Also read technical comments from manufacturers very carefully!** Usually, they know what their talking about. Manufacturers will usually try to caution potential customers against potential problems because they know that the ultimate blame may fall on their equipment, even if there are other process-related problems responsible for the difficulties. Next, we see the item description and the all important pricing. Notice that some available options for equipment will be quoted as "Adders". The commercial terms in this case include "FOB Factory, Freight Collect". This is the manufacturers way of saying, "once the equipment leaves our facility on a truck, it belongs to you." Freight Collect simply means that you will be responsible for paying the shipping company upon arrival. Some people take the FOB terms (or Freight on Board) very seriously, while other people seldom make it an issue (probably because any reputable shipping company carries insurance on all goods they ship). The delivery time is stated as "8-10 weeks after receipt of order or drawing approval, if required". Some pieces of equipment will require that the manufacturer produce certified drawings and send to the customer for approval. Once approval has been obtained, construction and material purchasing can begin. The terms of payment on this quotation are progress payments meaning that the customer is invoiced at various milestones of the transaction. Usually, progress payments are used for larger dollar amount jobs (maybe over \$50,000), but we showed them here for discussion purposes. Under the terms shown, 15% of the total will be invoiced upon purchase order award to the manufacturer, 35% will be invoiced after the certified drawings are sent to the customer, and 50% will be invoiced after the unit is shipped from the manufacturer to the customer. Net 30 essentially means that the invoice is to be paid within 30 days after it is issued. You'll also notice that the quoted price does not include any taxes, which are usually added to the invoice later or paid by the customer to their respective governments on a quarterly basis. Finally, you'll note that the quotation is copied to the local representative for the manufacturer.

Usually, the manufacturer's terms and conditions of sale will follow this page. These terms and conditions act as protection in the case that there is a dispute in the transaction at some point. Usually, the way that this works is that the customer buys the equipment according to their terms and conditions and the manufacturer sells according to their terms and conditions. On some large jobs, those involved may take a close look at these terms as the stakes may be much higher. However, for everyday transactions such as buying a shell and tube exchanger, the transaction will typically proceed smoothly. My advice would be to read over any conditions you are given and look for anything that appears to be unreasonable. One of the conditions most often disputed by manufacturers is called "Consequential Damages". This is the customer saying, "If your equipment, or the late delivery of your equipment, causes us to lose money via repairs, replacement costs, product value, etc., you will have to pay us for it." Most manufacturers will ALWAYS decline to agree to such a condition as it is essentially unlimited and could become very costly. In addition to the terms, a specification sheet detailing how the piece of equipment will operate would usually be included: