

**VENDOR TECHNICAL
EVALUATION PROCEDURE****JGS 210-120-1-77E**

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1. SCOPE

This standard practice covers the technical evaluation procedures for the vendors' data related to the petroleum refineries, petrochemical plants, gas plants, and similar plants.

This practice summarizes the major points for each category during vendors' data evaluation.

The scope of this practice covers the following specific items, which requires technical evaluation frequently and commonly.

- Tray
- Tower Internal, especially packing
- Pump
- Compressor
- Air Fin Cooler
- Heat Exchanger
- Vacuum system
- Water coalescer

2. EVALUATION PROCEDURE

The vendor's technical and cost proposal should be available. Among the lowest cost, two vendor's data should be evaluated from the technical view points. It is not necessary to evaluate all vendor's proposal, since the final vendor would be selected based on the lowest cost, mostly, regardless technical evaluation made with substantial man-power.

The contract condition should be carefully reviewed, whether vendor's bid evaluation report should be issued or not to the client. Technical evaluation report is not necessary, if contract conditions does not request to issue it. The technical evaluation should be made at the appropriate period, and any of the vague point should be clarified during this evaluation stage. If vendor could not comply the project requirement, with several reason such as vendor's standard, long term delivery to comply with the requirement, or alternatives for cost reduction, these should be clarified, and promptly reported into the evaluation report. By clarifying these deviation, during bid evaluation stage, the subsequent action for follow-up or client's approval is easy to settle.

The followings are the major factors to decide the vendor.

- Offered price
- Delivery conditions
- Schedule
- Technical acceptance
- Political reason

Technical evaluation should be made that the vendor shall comply with the JGC's requirements;

- Process performance
- Process guarantee
- Project specification requirement
- Delivery conditions
- Schedule

If vendor's proposal deviates from the required process performance, such vendor should be rejected from the technical view points. If optimistic considered that some deviation of process requirement could be relaxed, the final adjustment would be always required to comply with the fundamental process performance. The adjustment or additional requirement to the vendor will need additional price once purchase order is placed to the vendor.

Effective reflection of vendor's information to the basic design as timely is important to minimize the revision work.

3. WORK PROCEDURE

3.1 Bid Evaluation Table

Bid evaluation summary shall be prepared as technical evaluation. The summary should cover both process and mechanical requirement. Attached tables show the typical example of technical bid evaluation.

3.2 Vendor Clarification Meeting

It is recommended to have technical clarification meeting, prior to place order. This clarification meeting clarify the following points;

- Technical outstanding
- Delivery conditions
- Commercial conditions

3.3 Bid Evaluation Report

The bid evaluation report should cover the following topics;

- Recommended vendor
- Confirmation of technical compliance
- Delivery schedule of material
- Deviation / assessment

4. DETAIL EVALUATION NOTE

4.1 Tray Evaluation Procedure

The following should be evaluated to support the technical items;

(1) Process performance

- Tray load
- Flooding
- Pressure drop
- Turn down

(2) Mechanical condition

- Type of tray
- Material

(3) Others

The following point should be verified, of which would be serious problem during the detail design stage.

- Minimum liquid flow pass length
- Minimum down comer width (normally more than 10 % of tower diameter).
- Minimum cap density

(4) Design consideration

There are 4 major suppliers of the trays in the world.

- Koch (Flexi tray, Max frac tray)
- Glitch (Balast tray, Super fray tray, Nay tray)
- Norton (High contact tray)
- Nutter (Nutter float valve tray)

Among of these supplier, there was no serious technical concerns, and superior the performance each others. Therefore, the technical evaluation would be made, specifically, that compliance of the project specification.

4.2 Tower Internal Other than Tray

Tower internal (packing) is decided during process design. During process design, the type of packing random or structured is reviewed, to set up the operation condition. To simplify the evaluation method, tower diameter and height are normally prefixed, prior to prepare the process data sheet.

The following item should be evaluated as technical evaluation;

- Type of packing, distributor and packing support
- HETP for fractionation service
- Heat transfer coefficient for the exchanger device
- Flooding percent
- F factor ($v\sqrt{\rho}$)
- Pressure drop
- Turndown percent
- Minimum liquid rate

The distributor (including redistributor) is the one of the factor to perform best efficiency of the packing. Therefore, it is suggested that the following distributor design to cover vendor's supply.

- Liquid distributor (weir or spray or trough)
- Vapor distributor, with or without chimney tray

As for liquid distributor using spray, minimum pressure drop should be clarified during the bidding stage, since the external hydraulic system should be verified by the contractor, not the vendor.

4.3 Pump Selection

Currently, the rotary section has responsibility to determine the pump vendor selection. The pump should be selected together with following basic design consideration and the overall cost. The following is the major consideration.

(1) Shut off condition

The most of the discharge system has the design limitation to decided the design pressure. Normally design pressure of the pump discharge is decided based on the estimated shut off factor of 1.25 for motor drive and 1.38 for turbine drive.

However, during the pump selection, the head at shut off condition may exceed the above factor.

If there is a possibility to select to have higher shut off pressure than the estimated, the shut off pressure should be promptly informed to the process group so that design pressure could be adjusted to meet the selected pump head raise. However, this consideration should be totally evaluated as total project wise. i.e. reduction of cost by selection of pump, with high shut off head does not provide cost reduction totally.

Increasing of design pressure requires rework to catch-up, and consequence increases the total engineering cost, in addition to the hard of discharge system.

The design change at the late stage, due to insufficient shut off condition creates serious changes.

(2) NPSHR and NPSHA

The suction drum elevation or skirt height is subject to the selection of pump. Especially the pumps taking suction from the vessel with skirt requires the advanced information to determine the firm information.

Though the preliminary information could estimate the data of NPSHR, vendor's information would help to minimize the redesign work to finalize the skirt height, or elevation of suction vessel.

(3) Turn-down requirement, and minimum flow.

This information is also important at evaluation stage that some case requires to add additional nozzles at suction vessel for pump minimum flow.