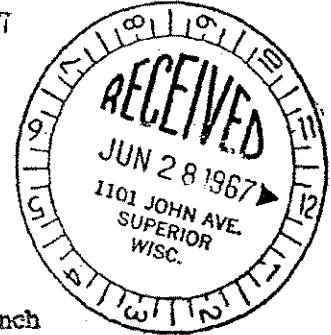


HYDRAULIC INSTITUTE



122 EAST 42nd STREET • NEW YORK, N. Y. 10017

June 23, 1967



Handwritten: All info to be sent to you by 6/28/67

Commanding Officer
Naval Ship Engineering Center
Washington, D. C. 20360

Attention: Head,
Refrigeration, Air Conditioning and Pumps Branch

Dear Sir:

Supplementing my letter of June 16, 1967, we have received an additional comment from Ingersoll-Rand Company on MIL-P-18682A. A copy of this comment is attached hereto, and we would appreciate your including this with the comments mailed to you previously.

Very truly yours,

Frank P. Anderson
Secretary

FPA:eu

Enclosure

cc: (ns00) Committee to Review Military Specifications
Institute Member Companies and Non-Member Companies on
Navy Qualified Products List for Centrifugal Pumps



SLM00170



Ingersoll-Rand Company

Established 1871

PHILLIPSBURG, N. J. 08865

June 20, 1967



Subj: Comments on MIL-P-18682A, dated 1 October 1966
Pumps, Centrifugal, Main Condenser Circulating,
Naval Shipboard

This letter covers the Ingersoll-Rand Company comments to MIL-P-18682A.

Paragraphs 3.1, 4.2 and 6.3 deal with product qualification. Paragraphs 3.1 and 6.3 indicate that only qualified pumps may be bid and awards will be made only for qualified pump. The pumps Ingersoll-Rand Co. has built to the previous revision of Subject specification did not exist at the date of invitation for bid. Paragraph 6.3 apparently attempts to cover this contingency by stating, "...manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification". Ingersoll-Rand Co. generally is allowed four to six weeks to work up a proposed new design pump for bid purposes. Work cannot be started prior to a request to bid since the hydraulic conditions and specification requirements are not known until this time. It is obviously not possible to qualify a new unit in six weeks, or even six months for that matter.

The mechanics of how to qualify a product for bid consideration are quite clearly spelled out in Section 4.2 of Subject specification. It appears quite unlikely to the writer that a potential pump supplier would spend a large sum of money to design and develop a pump and subject it to the required qualification tests just to be permitted to submit a bid on such a pump. There is no certainty that there would be a need for such a pump at the end of the twelve to eighteen month design-development qualification period and even less certainty of being awarded the contract. The requirement of prior qualification for each class, design and size pump that could be bid to Subject specification appears to be very unrealistic and quite impractical. The prior qualification requirement is not compatible with the extensive and exacting requirements of Subject specification.

-To Pg. 2-

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Paragraph 3.2.2.2: Pump replacement parts can be designed for 10,000 hours actual operating life, but it would be very risky for a pump supplier to guarantee 10,000 hours actual life. Pumps often work in systems handling liquids containing solid particles that can greatly shorten the useful life of a pump. Since the cleanliness of a system is beyond the control of a pump supplier, it would not be realistic to expect such a guarantee.

Paragraph 3.2.4.1: The word "normal" as applied to piping loads imposed on pumps should be defined. Pumps are not intended to be used as anchors to tie down piping systems.

Paragraph 3.2.9: Certain portions of the pump casing halve gasket in some designs may be considered to be internal. To prevent any misunderstanding of the intent in this area we request a sentence be added stating: "No part of the casing halve gasket on axial split pumps need be encased".

Paragraph 3.2.10: We request a sentence be added stating: "The setting end of studs shall be Class 5 fit, or Class 3 fit with locking resin per MIL-S-22473".

Paragraph 3.2.14.1: In accord with the convention of the Hydraulic Institute we assume the maximum horsepower output of the pump (commonly called water horsepower) is to be determined using clear, cold, fresh water at a temperature not over 85°F. Is this correct?

Paragraph 3.2.19: We recommend the word "internal" be added between, "All" and "threaded" in the first sentence. Does NAVSEC have a list of approved locking devices for the guidance of pump suppliers?

Paragraph 3.2.20: A minimum time limit of one minute (Paragraph 4.4.1.4(B)) should be added. A pump will not run backward indefinitely without damage.

Paragraph 3.3.3.11: Fatigue analysis is not possible for casting area geometry where theoretical stress analysis is lacking. The only way to justify the design in such areas is by experimental stress analysis (fatigue life proof test).

Paragraph 3.3.3.11.1: We question the validity of the value of 25,000 in the formula listed. The formula supposedly gives the maximum piping bending moment imposed on the pump nozzle when the piping is subjected to a bending stress equal to the yield strength of the piping. Equating the formula listed to the formula for piping bending moment is SDB-63 paragraph 1-480 results in a value of about 11,000 instead of the 25,000 value shown. This is based on MIL-T-16420 turbine with a minimum yield strength of 15,000 psi. Please explain how the value of 25,000 was arrived at?

-To Pg. 3-

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Paragraph 3.3.10.1: Why is NAVSEC approval required for alternate materials that will give equal or better service than the materials specified? The requirement of NAVSEC approval tends to be restrictive to a pump supplier when dealing with a private shipyard. The private yards are not too interested in taking their time to correspond with NAVSEC thru the cognizant SOS to obtain, what appears to the yard, to be "relief" for the pump supplier. If NAVSEC is willing to act on material approval requests received from the pump supplier on non-government contracts the restriction would be largely eliminated.

Paragraph 3.4.3.1: Special tools are to be included in the list of pump materials. This means that a complete set of special tools will be supplied with every pump sold. A complete set of tools are to be supplied with each set of onboard repair parts. Thus a ship with two engine rooms requiring six boiler feed pumps will receive eight sets of special tools, six sets with the pumps and two sets with the onboard repair parts. This appears to be a unnecessary and needless waste of government money. We feel the special tools should be shipped with the pumps but at a rate of one complete set for each machinery space. We recommend the third sentence be changed to read, "Special tools shall be detailed". We recommend the fourth sentence be changed to read, "One complete set of special tools required for the maintenance and repair of the pump units shall be furnished for each machinery compartment in which the pumps are installed, as specified (See 6.1)."

Paragraph 3.4.3.2: Delete the words, "and tools".

Paragraph 3.6.4.3.2: We suggest the pump supplier be given the option of making the NAVSHIPS 4786/4786A forms part of the Class B outline-certification drawing as required, or furnishing a sectional assembly-materials (parts) list drawing with the outline-certification drawing instead. Since the materials list already includes an indication of required onboard repair parts (See paragraph 3.9.4.2.1) it is repetitious to include the information again with another drawing. The 4786/4786A forms are a different size than any outline-certification drawing thus creating a filing problem with the supplier, the shipyard if involved, and the Government. We do not understand the last sentence. It is our understanding that each pump supplier is required to submit provision technical documentation in accordance with MIL-P-15137 and the equipment specification (MIL-P-17881B, Table III). The 4786A form submitted does not indicate what the Government actual purchases but what the manufacturer recommends for repair parts (See Block F, Note 1. of NAVSHIPS 4786). We suggest the words, "actually purchased", be deleted from the last sentence.

Paragraph 3.6.5.2: Is it permissible when supplying manufactures standard material (d) that has physical and chemical properties identical to a Federal or Military Specification, to so indicate rather than list the properties?

-To Pg. 4-

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Paragraph 3.7.5: Sufficient wear data versus hours of operation is not available in most instances to assure that the maximum clearances are, in fact, consistent with the minimum specified life of replacement parts (assumed to be 10,000 hours per paragraph 3.2.2.2). Conducting a 100 hour endurance test, or even a 10,000 hour endurance test, under test laboratory conditions of load and cleanliness is not fully indicative of wear rates actually encountered in service. Without a Government system of operational experience and repair data feedback to the equipment supplier it is not possible to fully satisfy this requirement.

Paragraphs 4.4.1.3 & 4.4.1.4(a): Must the overspeed test and mechanical soundness test of a turbine driven pump be conducted with design steam temperature or will a lower temperature steam be acceptable? Many Navy turbines are designed for 950°F/1195 psig steam. I know of no pump vendor that has this temperature superheated steam.

The writer is aware of only two test facilities in the country that may be able to conduct such a test with a steam turbine driven unit. Both facilities are owned by the Government. Since all pumps must undergo the mechanical soundness test, the two test facilities would be hard pressed to keep up with the incoming flow of pumps to be tested.

Paragraph 4.4.2.1: The performance test requirements for turbine driven pumps preclude the possibility of a pump supplier performing this test himself unless test steam temperature lower than the design temperature would be acceptable. See comments on Paragraph 4.4.1.4(a).

Paragraph 4.4.3: The procuring agency has the discretion to require a new design evaluation test if they deem necessary. It will be mandatory that the procuring agency make this decision to a potential supplier during the proposal stage. Since the supplier must bear this cost, the need for this decision during the pricing stage is obvious.

Paragraph 4.4.3.1.5(h): We do not see how one can project the wear rate found during a 100 hour test to 10,000 hours. Parts generally show a greater wear rate during the early hours of operation than occurs after many additional hundreds of hours of operation.

Paragraph 6.2: Table 1 -

Casings - Surface Ships: MIL-C-20159 Type II, 90-10 Copper-Nickel should be listed.

Casing bolts, studs, nuts: QQ-N-286 should be listed.

Diffusors (Type I Pumps): MIL-C-20159 Type II, 90-10 Copper-Nickel should be listed.

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June 20, 1967

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Impeller Nuts: QQ-N-286 should be listed.

Ingersoll-Rand Company personnel will be pleased to discuss these comments and recommendations with NAVSEC personnel if further clarification is desired.

Very truly yours,

INGERSOLL-RAND COMPANY

C. J. McGinnis, Supervisor
Machine-Navy Section
Cameron Engr. Dept.

bjv