

When pumps are supplied according to API 610, the documentation usually calls for various inspection certificates to ensure that the pump and its components have been appropriately tested and in some cases can be traced back to the raw materials. The request for inspection certificates should be clearly set out by the customer in the pump requirements documentation. However, there is frequently confusion and a misunderstanding about what the various inspection certificates are actually certifying, which can result in additional costs to rectify after production.

Inspection certificates type 2.x and 3.x

The first thing to clarify is the difference between 2.1 / 2.2 certificates and 3.1 / 3.2 certificates.

The 2.1 / 2.2 inspection certificates are about compliance with the order and are applied to the whole pump assembly. These certificates certify that the pump supplier has conformed to the relevant manufacturing standards whilst building the pump such as electrical, machinery at work etc.

A 2.1 certificate is a statement of compliance with the order by the manufacturer where no test results are provided. A 2.2 certificate is a statement of compliance with the order by the manufacturer based on non-specific inspections by the manufacturer. The 2.1 / 2.2 inspection certificates do not allow for any component traceability.

The 3.1 / 3.2 inspection certificates are only applied at the component level and never to an assembly or final product. They are generally for metallic components but can be applied to non-metallic. The 3.1 / 3.2 inspection certificates allow for component traceability at different levels and include the results from specific inspections, as detailed in the remainder of this guide.

Note that prior to 2004 there were more inspection certificates but these were replaced by or incorporated into the 2.1 / 2.2 and 3.1 / 3.2 certificates as follows:

- Certificate 2.3 – incorporated into 3.1
- Certificate 3.1A – replaced by 3.2
- Certificate 3.1B – replaced by 3.1
- Certificate 3.1C – replaced by 3.2

If a customer specifies inspection certificates 2.3, 3.1A, 3.1B or 3.1C then these this must be discussed with them as they are not current certificate types.

Inspection certificate 3.1 “type 3.1”

This is a document issued by the manufacturer in which the manufacturer declares that the products (that is the specific components in the pump, not the whole of the pumps) are in compliance with the requirements of the material standard and in which the manufacturer supplies the test results. The document is validated by the manufacturer’s authorised inspection representative, usually its own quality department.

A 3.1 inspection certificate can certify a batch of components or the raw material used in the manufacturing of a component. For example, a stockist of bar may supply a piece of bar with a 3.1 inspection certificate. This certifies that the **batch** of bar purchased by the supplier conforms to the material standard which applied when it was manufactured but does not certify that the **particular piece** of bar supplied matches the specific test certificate i.e. it is compliant bar manufactured within the tolerances of the material standard.

It is permissible for the pump manufacturer to transfer onto an inspection certificate 3.1 relevant test results obtained by specific inspection on primary or incoming products used (i.e. the inspection certificates of materials and external components used in the pump), provided that the manufacturer operates traceability procedures and can provide the corresponding inspection documents required. For example, the details from the bar supplied with a 3.1 certificate can be copied onto a certificate for the shaft that is made from the bar, i.e. the shaft can have its own 3.1 certificate.

Therefore, in summary, a pump supplied with an inspection certificate(s) 3.1 will relate to specific component(s) in the pump and not assemblies or the overall product. The 3.1 certificate(s) may relate to a batch of components or raw material from a supplier or to components manufactured by the pump company using raw materials from a batch with a 3.1 inspection certificate. There are no independently witnessed tests of specific components in a pump supplied with 3.1 certificate.

Inspection certificate 3.2 “type 3.2”

This is a document prepared by both the manufacturer’s authorised inspection representative such as quality control department, and must be independent of the manufacturing department, **and either** the purchaser’s authorised inspection representative or the inspector designated by the official regulations and in which they declare that specific components supplied are in compliance with the requirements of the material standard and on which the test results are supplied to validate this.

A 3.2 inspection certificate certifies a specific component(s) has been quality tested. This certification must be undertaken by a department other than the one manufacturing the component(s), such as the quality control department, and certifies that the component conforms to the requirements of the material standard. To verify a component conforms may involve positive material identification to certify the composition of the actual material used in a specific component (rather than a batch) and destructive testing such as a Charpy test. This may be accomplished, for example, during the production of a casting by a “coupon” of melt being poured alongside each casting and that coupon can then be destructively tested by the quality control department and a 3.2 inspection certificate can then be issued against a specific cast component. If a number of castings are poured, each and every one that comes from a different melt must be tested and inspected in order to receive a 3.2 inspection certificate so that each can be traced back to the original raw materials used.

In addition, in order to issue a 3.2 inspection certificate for a component, there must be an independent verification that the correct process has been followed and the correct records have been maintained for component traceability (for example the melt number) when manufacturing the component. This independent verification can be undertaken by the customer or by an independent inspector. The independent inspector however can be the pump manufacturer itself so long as the person undertaking the inspection is independent of the manufacturing and quality control process at the company and can demonstrate they have suitable skills to perform the role. However, most customers would expect an established independent witness organisation such as Lloyds or Bureau Veritas to undertake this task.

Whoever undertakes the independent witnessing, it is important to note that they **do not witness the actual testing of the component**, only that the processes, documentation and traceability have been undertaken correctly by the component manufacturer. It is also important to note that the independent inspection does not have to be one visit per component but a single visit can witness a number of components. For example, an order for four pumps will have four castings that may be poured at different times. The 3.2 inspection certificates for each casting can be issued for all four following one independent inspection.

Upgrading a type 3.1 certificate to a type 3.2 certificate

Materials and components that have a 3.1 inspection certificate can be re-issued with a 3.2 inspection certificate if the specific component is individually tested and verified by the manufacturer and the test process and traceability verified by the customer or an independent inspector. If destructive testing is required, then this must be carried out on the exact same material the component is manufactured from. For example a component manufactured from bar purchased with a 3.1 certificate (that applied to the batch or bar) must have a piece of the same bar the component is manufactured from destructively tested and verified, in a similar way that “coupons” poured at the same time as a casting are tested and verified.

It is permissible for the manufacturer to transfer onto the inspection certificate 3.2 relevant test results obtained by specific inspection on primary or incoming products used (i.e. the inspection certificates of materials and components used in the pump), provided that the manufacturer operates traceability procedures and can provide the corresponding inspection documents required.

Summary

In summary, a pump supplied with an inspection certificate(s) 3.2 will relate to specific component(s) in the pump and not assemblies or the overall product. The 3.2 certificate(s) will verify specific components comply and are traceable, and that the process, records and traceability of the pump manufacturer have been independently witnessed by the customer or an independent inspector.

Customers should be aware that when they simply ask the pump manufacturer for a 3.2 inspection certificate that such a certificate relates to individual components in the pump and not the overall pump. As such, a customer should be specifying the individual components that require 3.2 inspection certificate(s), such as the casing, impeller, suction cover, shaft etc. otherwise the pump manufacturer may only issue a 3.2 inspection certificate for the components it deems necessary. If the customer later requires a 3.2 inspection certificate on a different component then, due to destructive testing, this may not be possible without remanufacturing the component, which will carry an additional cost.

Furthermore, customers requiring 3.2 inspection certificates should be clear if they require an independent witness organisation (such as Lloyds or Bureau Veritas) to undertake this, as it carries an additional cost. Without specifying who will undertake the independent witnessing the pump manufacturer can appoint a witness from inside its own organisation. If the customer asks to use an independent witness organisation they should also state if they require an independent witness for each and every component (which again could have significant cost for an order of multiple pumps) or whether one inspection can be undertaken for a number of components.

It should be clear from the above that without giving specific instructions when asking for a 3.2 inspection certificate for a pump, the customer may not get what they were expecting and that the costs quoted by different pump manufacturers could vary greatly depending on how they interpret the request. Furthermore, the additional costs to post-rectify the production of components not originally supplied with 3.2 inspection certificates would then have to be borne by the customer.