

Standard Tolerances, Terms and Conditions of Quotation



Standard Tolerances and Specifications:

Protocast Inc's standard casting tolerances as specified below represent only the maximum deviation allowable. The maximum allowable deviation from engineering drawings or other manufacturing data is the sum of our casting tolerances

1) Casting tolerances:

a) Precision Sand, Rubber Plaster Mold

- a. **XY direction:** $\pm .005$ " 1st " ; $\pm .002$ " per inch for each inch thereafter.
- b. **Z direction or all dimensions across the parting line:** $+ .015$ " / $- .005$ " for the 1st inch ; $\pm .002$ " per inch for each inch thereafter. Add $\pm .005$ " for dimensions affected by parting line mismatch.

b) Investment Plaster Castings

- a. XY direction: $\pm .010$ 1st inch, then $\pm .007$ per inch for each inch thereafter
- b. Z direction or all dimensions $\pm .010$ 1st inch, then $\pm .007$ per inch for each inch thereafter

c) Location tolerance for mold inserts (cores): $\pm .015$ "

d) Angular alignment for mold inserts (cores): $\pm .5$ degrees

e) Features less than .075 may not fill depending on geometry, area, and casting alloy

f) Casting tolerances for **Die-castings and Permanent mold castings** are dependent on part geometry and material

2) Machining:

- a) Certain features that can be die cast cannot be cast using our process. The charge(s) listed under "Machined Casting" typically includes putting these features into the casting. Features that are not castable with our process include but are not limited to: cross-holes, holes smaller than .400" dia. with a depth/diameter ratio of greater than 1.5 and most holes with a diameter less than .187
- b) If we are quoting precision machining it will be included in the "Machined Casting" portion of the quote and **will include** the cost of machining non-castable features. Precision machining can only be quoted if the customer provides completed machining drawings. A budgetary quote for machining is typically included when no machining prints are supplied.
- c) If Protocast, Inc. is not doing the precision machining it will generally be more cost-effective for the customer to have the vendor doing the precision machining to also do the machining of non-castable features. Please discuss this with the estimating Engineer for.

Standard Tolerances, Terms and Conditions of Quotation

- d) If Protocast, Inc. is not doing the precision machining, it is strongly recommended that the customer or vendor that is doing the machining provide a CAD model with machine stock added to machined surfaces and features.

Appendix – Inspection Levels

The following factors determine the level of inspection:

1. Customer requirements
2. Customer print tolerances
3. Quantity

LEVEL 1 [IL1] - Internal only

Description: Check dimensions to print and/or model. No recording of data.

QC department: 1st piece only

Machinist: In process inspection

LEVEL 2 [IL2] - Internal or External

Description: Check dimensions to print and/or model. Record data of 6 or less critical features and/or 3 or less GD&T features limited to parallelism, perpendicularity or flatness.

QC department:

- a. 1st piece
- b. Create inspection sheets for recording data of critical features.
- c. Print markup.
- d. Inspection of parts as required.
- e. Provide customer QC reports if required.

Machinist: Record data of critical features per set frequency onto inspection sheets.

LEVEL 3 [IL3] - Internal or External

Description: Check dimensions to print and/or model. Record data per customer re-quest up to 100% inspection. This will be 7 or more critical features and / or 4 or more GD&T features of any kind, or 1 or more GD&T features other than parallelism, perpendicularity or flatness.

QC department:

- a. 1st piece.
- b. Create inspection sheets for recording data of required features.
- c. Print markup.
- d. Set frequency of part inspection.
- e. Provide customer QC reports if required.

Machinist:

- a. Record data of required features onto inspection sheets.
- b. Have QC inspect parts as required per set frequency.

LEVEL 4 [IL4] - At customer request only

Description: Same as level 3 in all respects except that in addition an outside source

Standard Tolerances, Terms and Conditions of Quotation

Acceptable Quality Levels

Foundry

100% Inspection on all First Articles and 100% up to Qty 5 parts

Visual inspection of quality level based off customer needs, and a minimum of 3 critical dimensions, verified with NIST standard calibrated equipment and documented on our Foundry In Process Inspection form. This will be accomplished by utilizing best practices of verifying complete and accurate castings based on the tolerances listed in our Terms and Conditions.

Orders of Qty 6-Qty 100 parts

Visual inspection of quality level based off customer needs and done on all parts. Dimensional inspection of a minimum of 3 critical dimensions on a Lot basis of 10% of parts, IE 1 out of every 10 parts and documented on the Foundry In Process Inspection form.

Orders of Qty 100+ parts

Visual inspection of quality level based off customer needs and done on all parts. Dimensional inspection of a minimum of 3 critical dimensions on a Lot basis of 5% of parts, IE 1 out of every 20 parts and documented on the Foundry In Process Inspection form.

Machining

100% Inspection on all First Articles and 100% up to Qty 10 parts

First Articles on each setup will be inspected utilizing our CMM to verify all documented dimensions called out on the Customer Print. The In Process Inspection, or Bench Inspections will be performed on 100% of all parts and verified with NIST standard calibrated equipment, and documented on our Machining In Process Inspection form.

Orders of Qty 11-99 parts

First Articles on each setup will be inspected utilizing our CMM to verify all documented dimensions called out on the Customer Print. The In Process Inspection, or Bench Inspections will be performed on 20% of all parts IE 1 out of every 5 parts, and verified with NIST standard calibrated equipment, and documented on our Machining In Process Inspection form.

Standard Tolerances, Terms and Conditions of Quotation

Orders of Qty 100+ parts

First Articles on each setup will be inspected utilizing our CMM to verify all documented dimensions called out on the Customer Print. The In Process Inspection, or Bench Inspections will be performed on 10% of all parts IE 1 out of every 10 parts and verified with NIST standard calibrated equipment, and documented on our Machining In Process Inspection form.

These are our Internal AQL standard Inspection rates, all of which are superseded by customer requirements.

3) **General Terms and Conditions:**

- a) All quoted pricing is good for thirty (30) days and subject to change thereafter.
- b) Buyer must notify Protocast at time of its Request for a Quotation (“RFQ”) if parts are to be inspected to AMS, MIL or other standards or specifications. Failure to do so may result in charges for parts that do not meet specifications.
- c) All quotations based on two-dimensional data are for preliminary budgetary purposes only, and are subject to change and review upon receipt of three-dimensional data file and/or pattern. In the event of a price increase, Protocast will provide notice to the Buyer before services are provided and/or charges are incurred. A three-dimensional model is required prior to starting a job. Protocast can provide one at an additional charge.
- d) If the Buyer is building and/or supplying patterns, the Buyer must consult Protocast for shrink compensation factors and addition of machine stock if applicable. Once the master patterns are received from the Buyer, Protocast assumes the pattern is correct and has been built with specified shrink factor. Buyer assumes sole responsibility for part(s) produced using Buyer’s patterns.
- e) Pricing is quoted based on industry standard plaster or air-set sand castings. All parts are cleaned and sand blasted or tumbled.
- f) Unless otherwise specified on purchase order, tools made by Protocast will be kept on location for six (6) months and then destroyed or otherwise disposed of at Protocast discretion. The Buyer has the option of requesting delivery of tools or paying for storage after 6 months.
- g) Any changes or additional work requested by customer after the job begins that result in additional time or material expenses will be billed to the customer at the rate of \$100 dollars per hour for engineering, \$85 per hour for machine shop time or \$65 dollars per hour for general shop time. Any direct costs and expenses will be additional.
- h) A full set of engineering drawings indicating all dimensions may be required from Buyer before precision machining can begin.
- i) Order acknowledgements are only confirming receipt of an order and do not constitute acceptance by Protocast Inc and also dba Protocast of all customer purchase order terms and conditions.

Standard Tolerances, Terms and Conditions of Quotation

- j) Expedite fees are based on an estimate of increased costs for Protocast to manufacture parts in the requested customer lead time. These fees will be charged regardless of actual delivery dates as Protocast will make a good faith best effort to deliver parts as requested, and costs will be incurred regardless of outcome.

4) **Payment Terms:**

- a) Net 30 days from date of invoice W.A.C. Tooling and other NRE will be invoiced upon shipment of first part(s).

-OR-

- b) Prepay: Payment for the Tooling, NREs and First Article must be made at the time of the Purchase Order. Prepayment for the order balance must be made prior to beginning the project castings, machining or shipment
- c) **Quoted costs reflect a 3% discount for non-credit card payments.** Discount does not apply to credit card payments. (Add 3% for credit card payments)
- d) **Orders for Sand or RPM castings with NRE's totaling \$20,000 or more will require 50% pre-payment**
- e) **Orders for die-castings will require 50% prepayment for NRE's**

5) **Returns, rework, and credit:**

- a) In the event that the part(s) ordered are not satisfactory, the following terms apply:
- (1) If the parts are outside of the standard casting tolerances as set forth above in section A, part(s) may be returned to Protocast within 14 days for credit.
 - (a) Protocast reserves the right to rework or replace parts
 - (b) Rework or replacement schedule depends on the amount of work required, shop load, and other factors
 - (2) Credit is only provided for part(s) that are returned to Prototype Casting.
 - (3) For all part(s) that are not received by Protocast that are retained by Buyer, payment in full is due pursuant to section 5a above.
- b) If the part(s) are within the standard casting tolerances set forth above, no returns will be accepted, no credits awarded, and payment in full is due, pursuant to section 5a above.
- c) In the event of any default in terms of payment, Buyer agrees to pay all costs of collection, including attorney's fees, collection costs, and all other costs incurred. If payment is not made when due, as set forth in section 5a above, the unpaid balance is subject to interest at the rate of 1.5% per month.

6) **Metal Surcharge Policy Protocast:**

In order to be able to provide the best possible and most accurate price to you at time of quote, we will be changing our quote method to include a material surcharge based upon the finished weight of the part. We have

Standard Tolerances, Terms and Conditions of Quotation

deemed this necessary based upon price fluctuations in the market and our desire to provide you the most accurate price. Our previous method had to account for the unknown material price at time of order based upon a risk factor. This risk factor is thus passed onto the end user. The policy is developed similar to how a fuel surcharge works. There is a base price of fuel and then a surcharge is added at time of order based upon current market prices.

For example, if we say that the base price of A356.2 aluminum is \$1.00/lb, your finished part weighs 10 lbs, and the current market price at time of order is \$1.30/lb. There would be a material surcharge of \$3 per part.

Part weight is defined at the weight of the part after it has been cleaned and it ready for machining or if machining is not ordered shipment to the next step.

Aluminum surcharge pricing: In order to be able to provide surcharge pricing based upon a published number in the market we will be using aluminum spot pricing from the LME. This is only for pure aluminum and not what the actual alloy of aluminum cost, however this will provide a fixed gauge for the amount of the surcharge. We will be using a base aluminum price of \$.65/lbs. At time of order we can provide the exact surcharge pricing per lbs. As of 7/31/2018 the spot price of aluminum was \$.94/lb. This would provide a material surcharge per pound of \$.29.

Zinc surcharge pricing: Same as aluminum, we will use the price of pure zinc as published on the LME. We will also be using a base price of \$.65/lb. As of 7/31/2018 the spot price of zinc was \$1.21/lb.

Magnesium surcharge pricing: Will be based upon the material price at time of order from our supplier. Our primary supplier is US Magnesium. Our pricing for AZ91D has remained unchanged for 2 years as we do not use a high volume of magnesium we only buy a few skids at a time. Base price will be \$3.00/lb

Here is a good reference for chart with historical pricing.

http://www.kitcometals.com/charts/aluminum_historical.html

7) **Shipping:**

All shipping and freight charges (including import/export charges, customs charges, sales and use taxes) are billed to Buyer and are in addition to the base price of prototype(s) ordered. Standard shipping is Federal Express next day unless otherwise specified by Buyer. Shipping is F.O.B. Denver, Colorado.

All Shipping damage must be documented and reported within 24 hours of receipt.