13 Checklist for Die Casting Die Specifications (To be used in consultation with your Die Caster)

NADCA
T-2-1-21
Checklist

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This two-part specification checklist is intended for use in consultation with your die caster prior to estimation of new die design and construction, or prior to die casting production using "inherited" tooling. It should be used in combination with checklists C-8-1 and C-8-2 in Commercial Practices, Section 8.

Part 1 — New Die Casting Dies: Items to be Addressed

In the case of new die casting dies, all of the items in Part 1, below, should be reviewed. Note, in the case of tooling to be transferred to, or "inherited" by a die caster, the items asterisked (*) in Part 1 should be addressed, plus the items noted in Part 2 on the next page.

Type of New Die	☐ Prototype Die Casting Die ☐ Production Die Casting Die
Cavity Steel*	☐ H13 ☐ Premium Grade H13 ☐ Superior Grade H13 ☐ Other Tool Steel: _____ NADCA No. 229 Certification Required: ☐Yes ☐No Grade _____ Class _____
Cavity Steel Heat Treat*	☐ Hardness Required: ☐ Toughness Required: _____ ft.-lbs NADCA No. 229 Certification Required: ☐ Yes ☐ No
Cored Holes*	☐ All Holes Cored ☐ Cored Holes As Noted On Print ☐ No Cored Holes
Die Operation for Part Features*	☐ Mechanical Movement ☐ Hydraulic Movement ☐ Features To Be Achieved By Secondary Operations
Estimated Part Volume	Monthly: _____ Annual: _____ Expected Product Life: _____
Casting Alloy*	Alloy ☐ Aluminum _____ ☐ Copper _____ ☐ Magnesium _____ ☐ Zinc _____ ☐ ZA _____
Casting Weight	Estimated Casting Weight: _____
As-cast Part Finish*	☐ Mechanical Grade (Functional Finish) (Ref. 125 Ra) ☐ Painting Grade (Ref 63 Ra) ☐ Highest Quality (Cosmetic Finish) For Plating, Etc. (Ref. 32 Ra) **Die wear can affect surface finish over the life of the die.*
Class of Die	☐ Unit Die ☐ Single Cavity ☐ Conventional Die ☐ Multiple Cavity ☐ Multiple Cavity - Family Die
Cast-In Date Insert*	☐ In Die Cavity ☐ Other Requirements: _____ ☐ Not Required
Cast-In Part Number*	☐ In Die Cavity ☐ Other Requirements: _____ ☐ Not Required
Other	Write in any other special requirements (ie. tolerances, leak testing, x-rays): _____

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Part 2 — New Die Casting Dies: Items to be Addressed (Continued)

Cast-In Logo, Lettering*	☐ In Die Cavity ☐ Other Include: _____ ☐ Customer Logo ☐ Cavity No. ☐ Supplier Logo ☐ Revision No. ☐ Recycling Logo ☐ Part Number
Die Layout	☐ Customer to Approve Layout ☐ Approval by Die Caster
First-Piece Approval	☐ Customer Approval Before Production Run Required ☐ Run on Die Caster Approval ☐ PPAP
Gages*	☐ Customer to Supply Special Gages ☐ Die Caster to Supply Special Gages
Trim Die	☐ Mechanical Movement ☐ Hydraulic Movement ☐ Features To Be Achieved By Secondary Operations
Machining Fixtures	☐ No Secondary machining required ☐ Machining reguired, no special fixtures ☐ Special machining fixtures required, customer to supply ☐ Special machining fixtures required, die caster to supply
Special Items	Special Items to be included in the tooling package: _____ _____

Part 3 — Inherited Die Casting Dies: Additional Items to be Addressed

In the case of inherited tooling, note the asterisked items (*) in Part 1, plus the items below.

Note that with transferred, or "inherited," tooling for die casting production the existing die casting die, the trim die, and, if required, the secondary machining fixtures, must be available for review and evaluation to determine whether the dies and fixtures are capable of producing to specifications and the extent of maintenance and/or rework required before the onset of production. This would include any adaptations of the die caster's equipment to accommodate production using the inherited dies. Final production estimates will be based on this review.

Inherited Die	☐ Die Casting Die Available for Evaluation ☐ Die to be Available for Evaluation (date): _____
Inherited Trim Die	☐ Trim Die Not Required ☐ Trim Die Available for Evaluation ☐ Trim Die to be Available for Evaluation (date): _____
Inherited Machining Fixtures	☐ Special Machining Fixtures Not Required ☐ Machining Fixtures Available for Evaluation ☐ Machining Fixtures to be Available for Evaluation (date): _____
Actual Casting Weight	Weight of Actual Casting: _____
Size of Die	Size of Casting Die (for equipment limitations): _____
Weight of Die	Weight of Casting Die (for crane limitations): _____
Availability of Die Design	☐ Yes ☐ No

Part 3 — Inherited Die Casting Dies: Additional Items to be Addressed (Continued)

Shot Sleeve	☐	Outside Diameter: _____
	☐	Inside Diameter: _____
	☐	Position in Mold: _____
Clamp Slots	☐	Outside DiameteSize: _____
	☐	Special Features: _____

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14 Guidelines to Increase Die Life

Before the start of tooling

1) Redesign of part to reduce or eliminate sharp internals corners or features that will promote early cracking of the tool steel.

2) Use of special tool steels in areas where high wear is expected (increases tool costs).

3) Insert area's of cavity blocks for more economical replacement (may increase tool costs) after tool wear has occurred.

4) Do a surface treatment (shot blasting) to the tool steel to help reduce heat checking and cracking (adds to tool cost). Note: This will add a surface texture to the die cast part.

5) Add a vibratory, shot blast or deburring operation to the part to help extend tool life (added part cost).

6) Add a machining operation to remove heat checking and/or cracking in areas that are critical on the part (adds to part cost).

7) Reclaim the surface hardness, if possible, when it drops from the 40's HRC to the high 30's HRC.

8) Coatings can be applied to the die surface to reduce wear and soldering.

9) Use internal cooling instead of die spray to cool the die. Spray is only to be used as a release agent.

Die Life Checklist

Class	Part Consideration
A	Critical to Function & Cosmetic
B	Cosmetic, No Function
C	Critical to Function
D	Not Critical but Functional
E	No Function

Class	Estimated Die Life/Shots
1	Less than 10,000
2	10,000 to 25,000
3	25,000 to 50,000
4	50,000 to 100,000
5	More than 100,000

Using the above will develop and itemize the areas of concern of a sample part.