ICE	BUSINESS PRACTICE PROCEDURE			
Title:	**DRAWINGS – UNIFORM INTERPRETATION**	Doc No. BPC21	Rev: A	Effective Date: 7/5/2012

REVISION HISTORY:		**Prepared by:**	S. Fink	**Approved By:**	
Revision	**Date**	**Description of Change(s)**			
-	3/10/2008	Initial Release			
A	7/5/2012	Update to Paragraph 4.5.1.			

1.0 Purpose:

This Business Practice establishes a uniform practice of interpretation of requirements of drawings. This standard supplements information requirements found on the field of the drawing and has no priority over information found on the drawing.

2.0 Scope:

This procedure is applicable to Mechanical Design to establish a uniform practice of interpreting requirements on ICE-developed drawings.

3.0 Responsibilities and Authority:

None.

4.0 Procedure:

The priority and hierarchy of documents in force shall be as follows:

4.1 Purchase Orders

4.1.1 Purchase Order Modifications

All documents listed below require a modification to the Purchase Order

A. Authorized Engineering Order documents with required signatures.
B. Authorized Non-conforming Material documents with the required signatures.
C. New drawing revision.
D. Redlined New Revision with the required signatures.

4.2 Work Orders

A. Authorized Engineering Order documents with required signatures.
B. Authorized Non-conforming Material documents with the required signatures.
C. New drawing revision.
D. Redlined New Revision with the required signatures.

4.3 Drawings

A. The field of the drawing.
B. The title block of the drawing.
C. Notes on the drawing.
D. Documents referenced on the drawing.

4.4 Engineering Practices (Drawings-Uniform Interpretation) Business Practice Procedure

A. All sections of this document.

4.5 Workmanship

4.5.1 Burrs and Sharp Edges

A. All burrs and sharp edges shall be removed per Class 1 or 2 below. Methods include but are not limited to, abrasive blasting, vibratory finishing (tumbling), brushing, sanding. A 45-degree chamfer may be added to a work piece (within tolerances defined in Class 1 and 2 below) to aide in reducing the time it takes to break edges, but is not considered an edge break.

Class 1: For thin materials, .050-in thick or less, a burr free edge (when viewed at a 5X magnification) with a radius or edge break less than t/10, where t is the thickness at the edge to be measured.

Class 2: For a workpiece thickness greater than .050-in at the edge of interest, a burr free edge (when viewed without magnification) with a radius or edge break of .005 to .020 in. maximum.

B. There shall be no hanging burrs in intersecting holes, counter bored edges, or thread forms (when viewed at a 5X magnification).

4.5.2 Surface Requirements

A. Machined surface textures shall be 63 micro-inches or better and applied after plating or heat-treating, and before painting as applicable.

B. Unmachined aluminum surfaces shall have the surface scale removed resulting in a surface finish of 63 micro-inches or better.

4.5.3 Cleanliness

A. No cutting solvent residue.

B. No salt residue.

C. No weld splatter.

D. No packed chips in threaded holes.

E. No loose chips in any parts.

F. Helical coil tangs must be removed.

G. No scratches or scarring of surfaces greater than 63 micro-inches or as required on the field of the drawing.

H. No foreign material on any surface of any part not required by the drawing.

I. Piece marking shall mark the Inter-Coastal Electronics, Inc. part number as shown on the drawing as follows:

1. An Inter-Coastal Electronics Inc. part number is defined as the drawing number plus the three-digit configuration identifier delineated on the drawing and/or drawing parts list (e.g. 12345-001)
2. Methods of approved part marking are delineated on the drawing and are listed as follows:
    a. Engrave-location of piece marking plus font style, size, depth and width of engraving to be identified by note on the drawing.
    b. Bag and Tag –method of marking is optional, but must be legible, and readable and can mean any of the following:
        i. Non-metallic tag and string
        ii. Non-metallic tag and wire
        iii. Metallic tag and wire
        iv. Bag item and tag
        v. Tag item and bag
        vi. Non-metallic band or tape
        vii. Metallic band or tape

4.5.4 Defects

Material defects that are not part of the machining process, such as fractures, material separations, blowholes, etc., shall be evaluated by Inter-Coastal Electronics, Inc. Engineering (Quality Incoming Inspection and/or Material Review Board) on a case by case basis. Removal of material beyond drawing dimensions is not acceptable unless appropriate authorization documents are provided and approved. Appropriate documents include the following: Purchase Order modification, Engineering Change Order, or new drawing revision.

4.5.5 Special Processes

Special processes shall not be used in the manufacturing of parts or assemblies unless specifically referenced on the field of the drawing, in the notes on the drawing, by documents identified in the notes on the drawing, or on purchase order specifications. Special processes are defined as any process that alters the chemical or metallurgical properties of the parent material or its surfaces, or deviates from the engineering requirements of the drawing or purchase order. Procedures such as hole plugging, welding, patching, chemical processes are not acceptable, unless appropriate authorization documents are provided and approved. Appropriate documents include the following: Purchase Order modification, Engineering Order, or new drawing revision.

4.6 Substitutions

No substitution of items or elements of the material specifications or the parts list is authorized unless appropriate authorization documents are provided and approved. Appropriate documents include the following: Purchase Order modification, Engineering Order, or new drawing revision.

4.7 Dimensions

4.7.1 All dimensions are in inches.

4.7.2 Bracketed dimensions are in millimeters.

4.7.3 Dimensions and tolerances apply after processing. Processing is defined as operations such as heat-treating, annealing, plating, welding, etc.

4.7.4 Dimensions apply before painting or powder coating as applicable.

4.7.5 Tolerances on dimensions are as follows, unless otherwise specified on the drawing:

A. X.XXX ± 0.005

B. X.XX ± 0.01

C. X.X ± 0.1

4.7.6 Tolerances on angles are as follows, unless otherwise specified on the drawing:

A. X.XXX° ± 0.10°

B. X.XX° ± 0.25°

C. X.X° ± 0.50°

D. X ° ± 1°

4.7.7 Tolerances on hole diameters are as listed below in Table 6.7, unless otherwise specified on the drawing:

TABLE 6.7 – HOLE TOLERANCES

Diameter from (inches)	Diameter to (inches)	TOLERANCE (inches)
0.00	0.125	+.004/-.001
0.126	0.250	+.005/-.001
0.251	0.500	+.006/-.001
0.501	0.750	+.008/-.001
.0751	1.000	+.010/-.001
1.001	2.000	+.0.010/-.002
Over 2.000		+.015/-.005

4.7.8 Tolerances indicated in Table 6.7 do not apply to counterbore, countersink and/or spotface diameters. These features are toleranced as any other dimension as described above.

4.7.9 Spotface depth shall be a minimum of 0.005 to a maximum of 0.015, unless otherwise specified on the drawing.

4.7.10 Straightness of any centerline shall be within 0.002 per foot.

4.7.11 Internal corner radii shall be 0.010 ± 0.005

Alignment of holes through opposite wall or features shall be considered as one hole through an equivalent material thickness, if and only if centerlines have been extended through both walls, or features, on the field of the drawing. All tolerances apply accordingly whether considered as one hole or two holes.

4.8 Reference Documents

4.8.1 All reference documents noted on the field of the drawing shall be to the latest revision at the time of drawing release.

4.9 Material Stock Thickness

4.9.1 Material stock thickness identified on the drawing may be exceeded as long as all material specifications of tensile strength and material type are met, all dimensions on the drawing are met, and no special processes are performed and/or added to the drawing.

4.10 Painted Parts

4.10.1 Painted parts are not to be handled or delivered until after the cure or handling time has been completed. Do not apply foreign material to a painted surface.

4.11 Hardware

4.11.1 Captive hardware and inserts are to be installed per manufacturer's specifications and are to be installed after any surface treatment.

4.11.2 Floating fasteners must float within full radial specifications after installation.

4.12 Threads

4.12.1 External threads not covered by specifications on the field of the drawing and are rolled or cut shall have a lead in chamfer of 40° to 50°. The chamfer shall extend from the minor diameter to the first full thread.

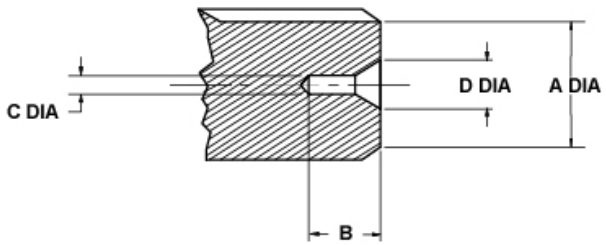
4.12.2 Internal threads not covered by specifications on the field of the drawing shall have a lead in chamfer formed from an 80° to 120° countersink from the major diameter to the first full thread.

4.13 Machine Centers

4.13.1 Machine centers shall not be larger than specified below in Table 11.1. If the center is required on a face that has external thread, key ways or chamfers the minimum face diameter will be the minor diameter of the threads and will not include chamfers or key ways.

TABLE 11.1 – MACHINE CENTERS

"A" MIN. FACE DIA.	"B" DEPTH MAX.	"C" DIA. MAX.	"D" DIA. MAX.
0.187 thru 0.249	0.114	0.047	0.125
0.250 thru 0.436	0.173	0.078	0.188
0.437 thru	0.231	0.109	0.250
0.750 thru 0.874	0.287	0.125	0.313
0.875 thru 0.999	0.404	0.188	0.438
1.000 thru 1.999	0.462	0.219	0.500
2.000 thru 2.999	0.575	0.250	0.625
3.000 and up	0.692	0.313	0.750



5.0 Records:

5.1 Proprietary Rights

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6.0 Forms:

None.

7.0 Appendices:

Drawings shall be interpreted per the following, unless otherwise specified.

Document Number	Title
DOD-D-1000	Drawings, Engineering and Associated Lists
DOD-STD-100	Engineering Drawing Practices
ANSI Y 14.5M-1994	Dimensioning & Tolerancing

8.0 Flowcharts

None.