

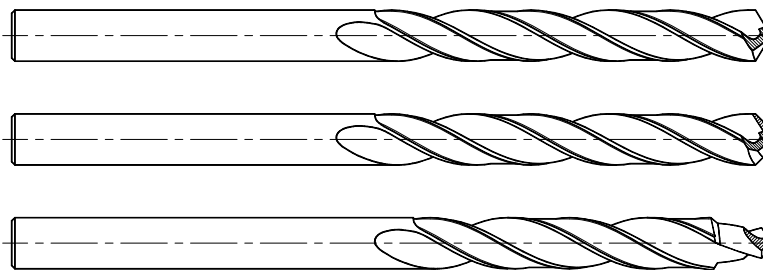
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**DRILLS, CARBIDE, DOUBLE-MARGIN,
1/8 INCH THRU 1 INCH**



REVISION DATE:
ISSUE DATE: AUGUST 31, 2015

THIRD ANGLE PROJECTION	CUSTODIAN ENGINEERING MANAGEMENT COMMITTEE	REVISION NEW
PROCUREMENT SPECIFICATION NONE	TITLE DRILLS, CARBIDE, DOUBLE-MARGIN, 1/8 INCH THRU 1 INCH	CLASSIFICATION SPECIFICATION NAS988 SHEET 1 OF 34



Documents
SHEET 1 OF 34

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1. INTRODUCTION

1.1 Purpose

This document provides the aerospace industry with the uniform standard for the procurement of precision double-margin carbide twist drills. Utilization of the specified drills in accordance with recommended applications will ensure the performance of precision close-tolerance drilling tasks with optimum quality, reliability, and economy.

1.2 Scope

Included in the standard are ordering requirements, drill design parameters, pertinent nomenclature, and point geometries, suggested areas of application, acceptable carbide materials, and a Glossary of Terms defining relative terminology.

2. TOOL FUNCTION

To produce a close tolerance hole in one step.

3. PACKAGING INSTRUCTIONS

Drills shall be individually packaged in cardboard or plastic containers, with both ends closed. Extra care shall be taken to prevent damage to carbide. Recyclable packaging materials are preferred.

Each package will contain the following information:

- a) Manufacturer name or symbol;
- b) Manufacturer lot number;
- c) Drill diameter; and
- d) Tool identification number.

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4. TOOL NUMBERING EXAMPLE

Number Example: NAS988 - A - .3750 - 4.00 - 1.50 - P6CFD - 7B1 - .3150 - .3750 - C

Specification: _____

Drill Type: _____

A = Standard Duty Double Margin

B = Medium Duty Double Margin

C = Heavy Duty Double Margin

Diameter: _____

Over All Length: _____

Flute Length: _____

Point Options: _____

P3C = 135° Split Point

P5C = 118° Split Point

P6C = 118°/90° Double Angle Split Point

Add: F - for Faceted; D - for Dub

Shank Type: _____

1 = Straight Shank

2 = Straight Shank With Tri-Flats

4 = Reduced Straight Shank

5 = Reduced Straight Shank With Tri-Flats

7 = Threaded Shank Adapter

7A1 = 1/4-28 Thread - Hex Flats

7A2 = 1/4-28 Thread - Round With Flats

7B1 = 5/16-24 Thread - Hex Flats

7B2 = 5/16-24 Thread - Round With Flats

7C1 = 3/8-24 Thread - Hex Flats

7C2 = 3/8-24 Thread - Round With Flats

7D1 = 7/16-20 Thread - Hex Flats

7D2 = 7/16-20 Thread - Round With Flats

7E1 = 9/16-18 Thread - Hex Flats

7E2 = 9/16-18 Thread - Round With Flats

7F1 = 5/8-18 Thread - Hex Flats

7F2 = 5/8-18 Thread - Round With Flats

Step Diameter: _____

Step Diameter Not To Be Less Than 70% Of Drill Diameter.

Add Zeros In Tool Number If Step Is Not Required.

Step Length: _____

Add Zeros In Tool Number If Step Is Not Required.

Coolant Holes: _____

N = No Coolant Holes

C = Coolant Holes

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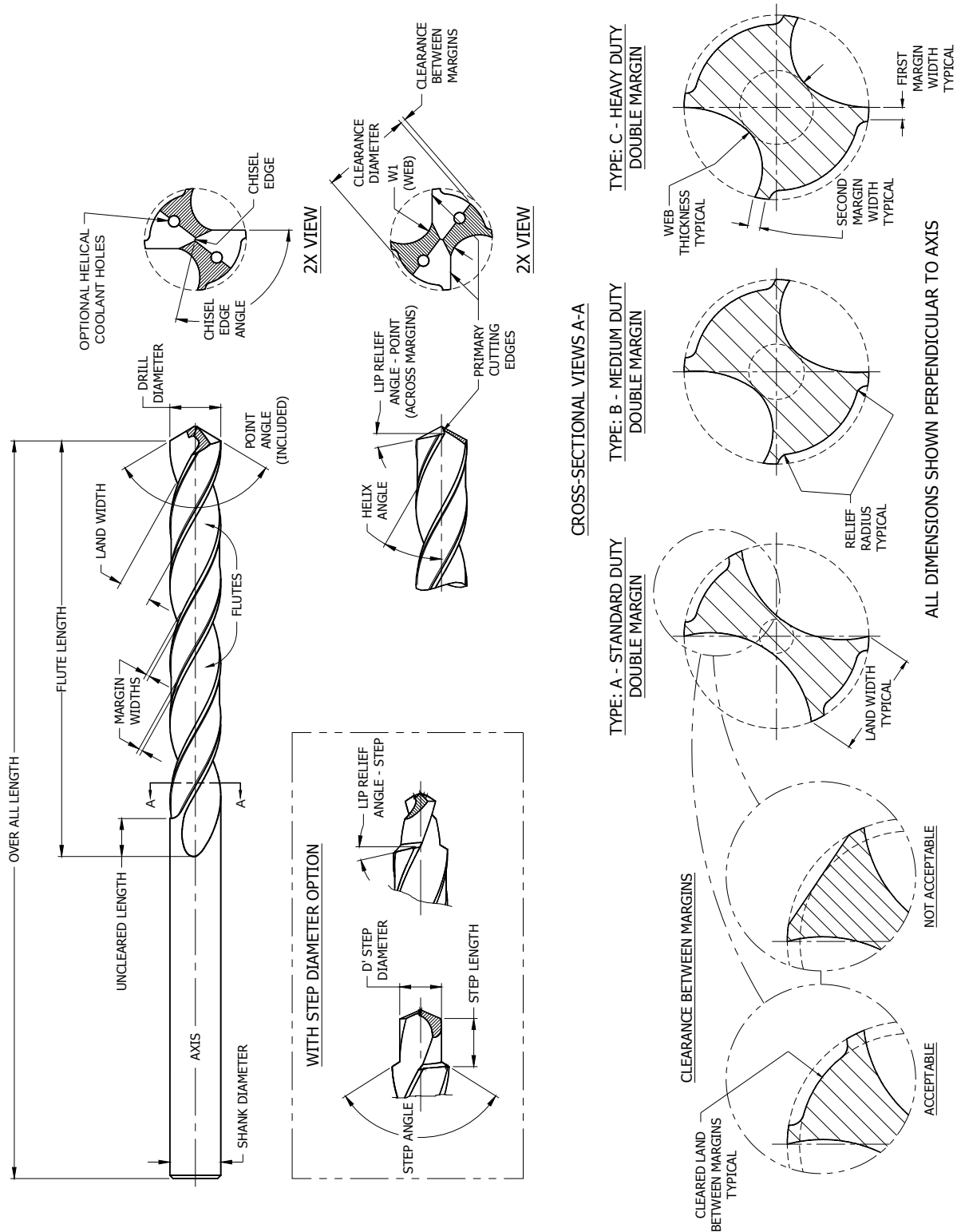


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5. TWIST DRILL NOMENCLATURE (CONVENTIONAL POINT)



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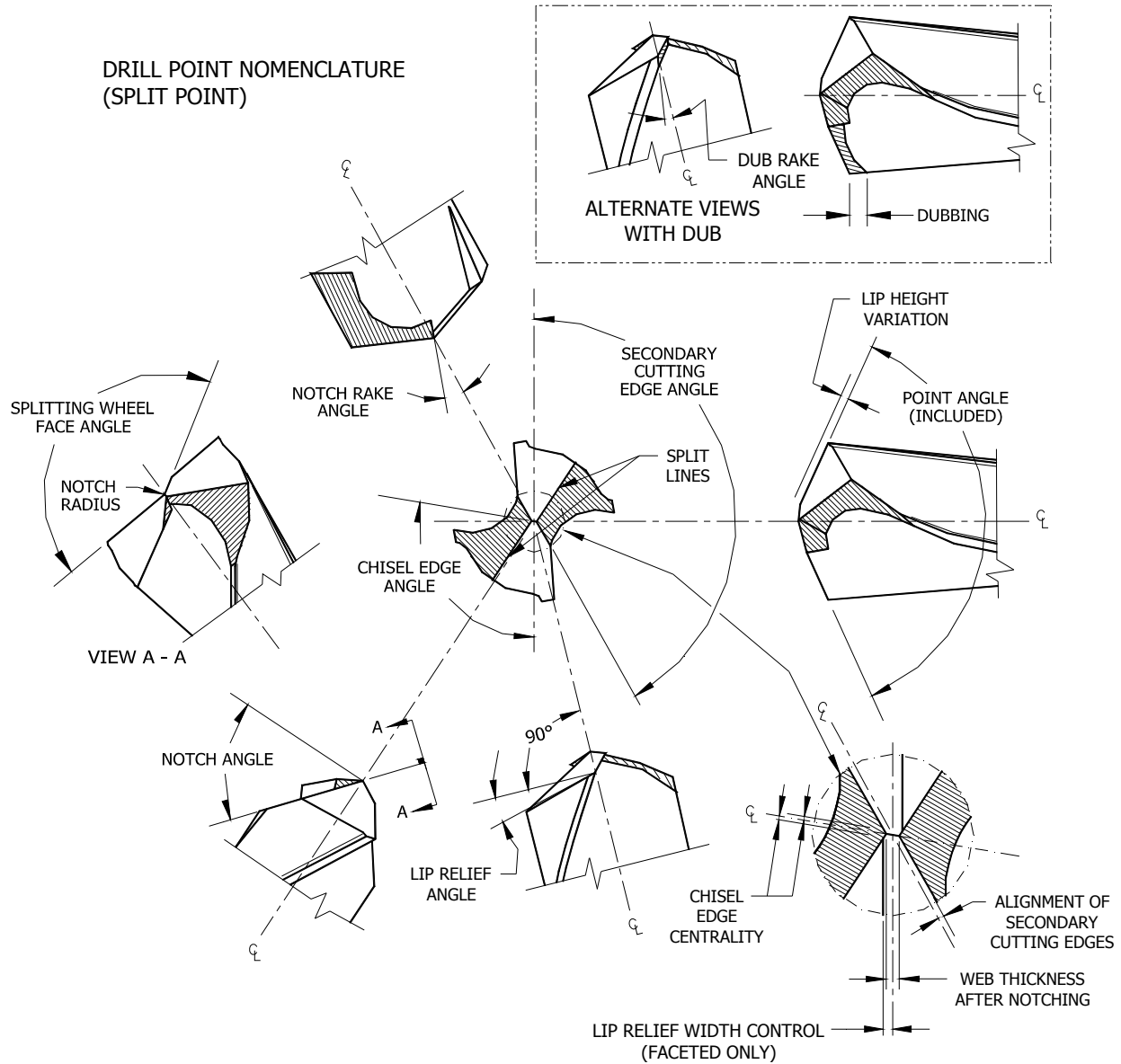
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6. DRILL POINT NOMENCLATURE (SPLIT POINT)



SHADING REPRESENTS AREAS GROUND DURING NOTCHING AND DUBBING OPERATIONS.
SEE GLOSSARY OF TERMS FOR DEFINITIONS.

7. TYPE "A" STANDARD DUTY DOUBLE MARGIN DRILL

TABLE I – TYPE "A" DRILL

APPLICATION	See Table XIV, APPLICATION SUMMARY FOR ALL DRILL TYPES
DRILL MATERIAL	Tungsten Carbide: 90%±.5% Cobalt: 10% ±.5% Hardness: 91 – 93 HRA Porosity: A02 B00 C00 (per ASTM B276) No eta phase Less than 1% other carbides
SURFACE FINISH	Ground surfaces will comply with Element Dimensions and Tolerances. No discoloration is allowed.
WEB THICKNESS	Web thickness shall be 24% of drill diameter.
WEB CONSTRUCTION	Web thickness shall increase in a uniform taper of 0.006 ± 0.002 inch per inch from "w1" at point to end of full depth of flutes.
HELIX ANGLE	30°
MARGIN WIDTH	Margin width to be: 0.1250-0.1874 diameter: 0.015-0.020 0.1875-0.2499 diameter: 0.020-0.025 0.2500-0.5000 diameter: 0.025-0.030 0.5000-0.7500 diameter: 0.030-0.035 0.7500-1.0000 diameter: 0.035-0.040
LAND WIDTH	Land width to be 42-50% of drill diameter.
TYPE POINT	P3C (135°) STANDARD.
IDENTIFICATION	Manufacturer's name or symbol, drill type, manufacturing lot number, part number and diameter to be marked on shank with laser marking. Identification shall be permanent and legible (without magnification). Acid etching is not permitted. Identification marking shall not be raised above the shank surfaces.
CLEARED LAND BETWEEN MARGINS	8%-10% of drill diameter. The cleared area between the margins must be uniform in depth.

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8. TYPE "B" MEDIUM DUTY DOUBLE MARGIN DRILL

TABLE II – TYPE "B" DRILL

APPLICATION	See Table XIV, APPLICATION SUMMARY FOR ALL DRILL TYPES
DRILL MATERIAL	Tungsten Carbide: 90%±.5% Cobalt: 10% ±.5% Hardness: 91 – 93 HRA Porosity: A02 B00 C00 (per ASTM B276) No eta phase Less than 1% other carbides
SURFACE FINISH	Ground surfaces will comply with Element Dimensions and Tolerances. No discoloration is allowed.
WEB THICKNESS	Web thickness shall be 30% of drill diameter.
WEB CONSTRUCTION	Web thickness shall increase in a uniform taper of 0.006 ± 0.002 inch per inch from "w1" at point to end of full depth of flutes.
HELIX ANGLE	30°
MARGIN WIDTH	Margin width to be: 0.1250-0.1874 diameter: 0.015-0.020 0.1875-0.2499 diameter: 0.020-0.025 0.2500-0.5000 diameter: 0.025-0.030 0.5000-0.7500 diameter: 0.030-0.035 0.7500-1.0000 diameter: 0.035-0.040
TYPE POINT	P3C (135°) STANDARD.
IDENTIFICATION	Manufacturer's name or symbol, drill type, manufacturing lot number, part number and diameter to be marked on shank with laser marking. Identification shall be permanent and legible (without magnification). Acid etching is not permitted. Identification marking shall not be raised above the shank surfaces.
CLEARED LAND BETWEEN MARGINS	8%-10% of drill diameter. The cleared area between the margins must be uniform in depth.

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9. TYPE "C" HEAVY DUTY DOUBLE MARGIN DRILL

TABLE III – TYPE "C" DRILL

APPLICATION	See Table XIV, APPLICATION SUMMARY FOR ALL DRILL TYPES
DRILL MATERIAL	Tungsten Carbide: 90%±.5% Cobalt: 10% ±.5% Hardness: 91 – 93 HRA Porosity: A02 B00 C00 (per ASTM B276) No eta phase Less than 1% other carbides
SURFACE FINISH	Ground surfaces will comply with Element Dimensions and Tolerances. No discoloration is allowed.
WEB THICKNESS	Web thickness shall be 35% of drill diameter.
WEB CONSTRUCTION	Web thickness shall increase in a uniform taper of 0.006 ± 0.002 inch per inch from "w1" at point to end of full depth of flutes.
HELIX ANGLE	30°
MARGIN WIDTH	Margin width to be: 0.1250-0.1874 diameter: 0.015-0.020 0.1875-0.2499 diameter: 0.020-0.025 0.2500-0.5000 diameter: 0.025-0.030 0.5000-0.7500 diameter: 0.030-0.035 0.7500-1.0000 diameter: 0.035-0.040
LAND WIDTH	Land width shall be 57% ±.010 of drill diameter.
TYPE POINT	P3C (135°) STANDARD.
IDENTIFICATION	Manufacturer's name or symbol, drill type, manufacturing lot number, part number and diameter to be marked on shank with laser marking. Identification shall be permanent and legible (without magnification). Acid etching is not permitted. Identification marking shall not be raised above the shank surfaces.
CLEARED LAND BETWEEN MARGINS	8%-10% of drill diameter. The cleared area between the margins must be uniform in depth.

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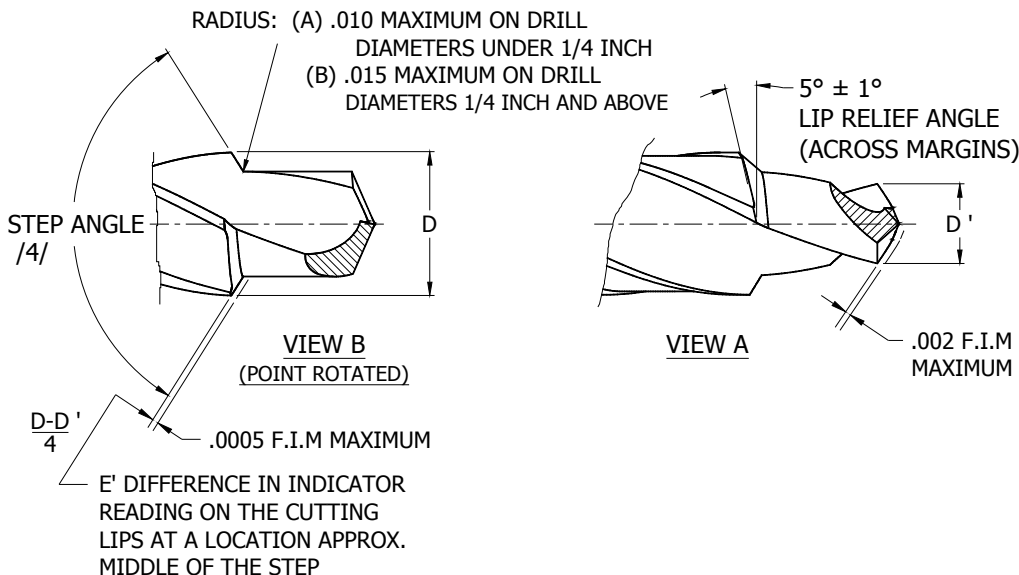
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10. STEP GEOMETRY – DOUBLE MARGIN DRILL



- (1) RECOMMENDED STEP DIAMETER (D') TO BE 80% OF MAJOR DIAMETER. STEP DIAMETER NOT TO BE LESS THAN 70% OF DRILL DIAMETER.
- (2) STEP (D') TO BE CYLINDRICAL, WITH MAXIMUM OF - .0025 INCH RADIAL DROP BODY CLEARANCE ALLOWED (MEASURED BY AN OVERALL REDUCTION OF DIAMETER AT THE BACK, LAND AREA OF THE STEP).
- (3) CONCENTRICITY OF STEP DIAMETER WITH MAJOR DIAMETER TO BE WITHIN .0005 INCH F.I.M. MEASURED OFF BODY ADJACENT TO STEP.
- /4/ THE MEASUREMENT OF MISMATCH OF THE STEP ANGLE (POINT P5C: 118° INCLUDED AND POINT P3C: 135° INCLUDED) CUTTING LIPS OF THE MAJOR DIAMETER MUST NOT EXCEED .0005 INCHES F.I.M. MEASURED AS ILLUSTRATED IN VIEW "B".
- (5) NO UNDERCUT PERMITTED AT INTERSECTION OF STEP DIAMETER AND STEP ANGLE.
- (6) RECOMMENDED STEP LENGTH TO BE ONE DRILL DIAMETER.
- (7) STEP ANGLE DROP FROM STEP CUTTING EDGE TO HEEL OF TRAILING MARGIN TO BE A MINIMUM OF .005 INCH.

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