SURFACE VEHICLE RECOMMENDED PRACTICE

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Universal Joint End Yoke Connection (Earwork)

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

STABILIZED NOTICE

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1. ***Scope—***This document specifies the main dimensions and tolerances, which affect interchangeability between end yoke earwork for the most common North American used universal joints. Dimensions and tolerances of the mating universal joints are left to the discretion of the universal joint manufacturers.

The term “Earwork” refers to the configuration and geometry defining end yoke connections directly provided for universal joint cross attachment of drivelines.

Earwork for certain styles of universal joint connections and flange connections have for a long time been proprietary to certain manufacturers. Over years of usage, proprietary rights have expired and the industry, as a whole, has used these earworks as standard. In an effort to tabulate some of the long established practices, the following SAE Recommended Practice has been compiled. Manufacturers do from time to time, as the need arises, change tolerances or fits to better enhance component performance. This document has been prepared as a reference, and is a snap shot of current technology.

The half round (strap connection), full round (retainer plate type connection) and wing type connection are covered in this document. For an understanding of these end yoke styles, please refer to SAE J901.

There are earwork forms that still are proprietary and are not covered by this document.

1.1 Rationale—End yoke direct connections have historically been a practical, effective, generally accepted and relatively economical method of attachment of drivelines to vehicle components. Industry practices exist to connect flanged drivelines to vehicles (reference SAE J1945 and J1946). No documentation, however, exists for direct yoke connections. This Recommended Practice will establish this documentation for connecting geometry for full round, half round and wing style end yokes.

2. ***References***

2.1 Applicable Publication—The following publication forms a part of this specification to the extent specified herein. Unless otherwise indicated, the latest version of SAE publications shall apply.

2.1.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J901—Universal Joints and Driveshafts—Nomenclature—Terminology—Applications

2.2 Related Publication—The following publication is provided for information purposes only and is not a required part of this document

2.2.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AE-7—Universal Joint and Driveshaft Design Manual

3. Dimensions and Tolerances—Main nominal dimensions and tolerances, which affect the interchangeability of end yoke earwork, are shown in Section 4.

4. Figures and Tables

TABLE 1—DIMENSION/FEATURE DESCRIPTION TABLE

Dimension	Feature Description
A	Prime Locating Dimension (basic functional spacing for universal joint bearing)
B	Universal Bearing Outside Diameter fit to yoke (does not apply to wing earwork)
C	Bolt Hole/Threaded Hole Spacing (for fasteners used in attaching the universal bearing to the yoke)
D	Wing Keyway Width (applies only to wing earwork)
E	Bolt Hole Location Dimension (symmetric location of C; applies to wing and half round yokes)
F	Swing Diameter (largest diameter occupied by centered rotating earwork)
G	Drilled Option (for wing only; when yoke is drilled and bearing bushing is tapped)
H	Threaded Specification (for wings, yoke is tapped and bearing bushing has through hole)
J	Clearance Turning Diameter (for wing only; typically required on smaller sizes)
K	Tang Height (for wing only) or Retaining Height (for half round only)
L	Minimum Depth of Thread
M	Depth of Keyway (for wing only)
N	Minimum Depth of Threaded Hole
P	Minimum Section Required (for wing only)
R	Yoke Ear Width (for wing only)

TABLE 2—DATUM DESCRIPTION TABLE

Datum	Datum Description
W	Primary Datum (Yoke rotational centering feature i.e., spline, bolt circle, pilot diameter, etc.)
X	Secondary Datum
Y	Tertiary Datum
Z	Alternate Datum

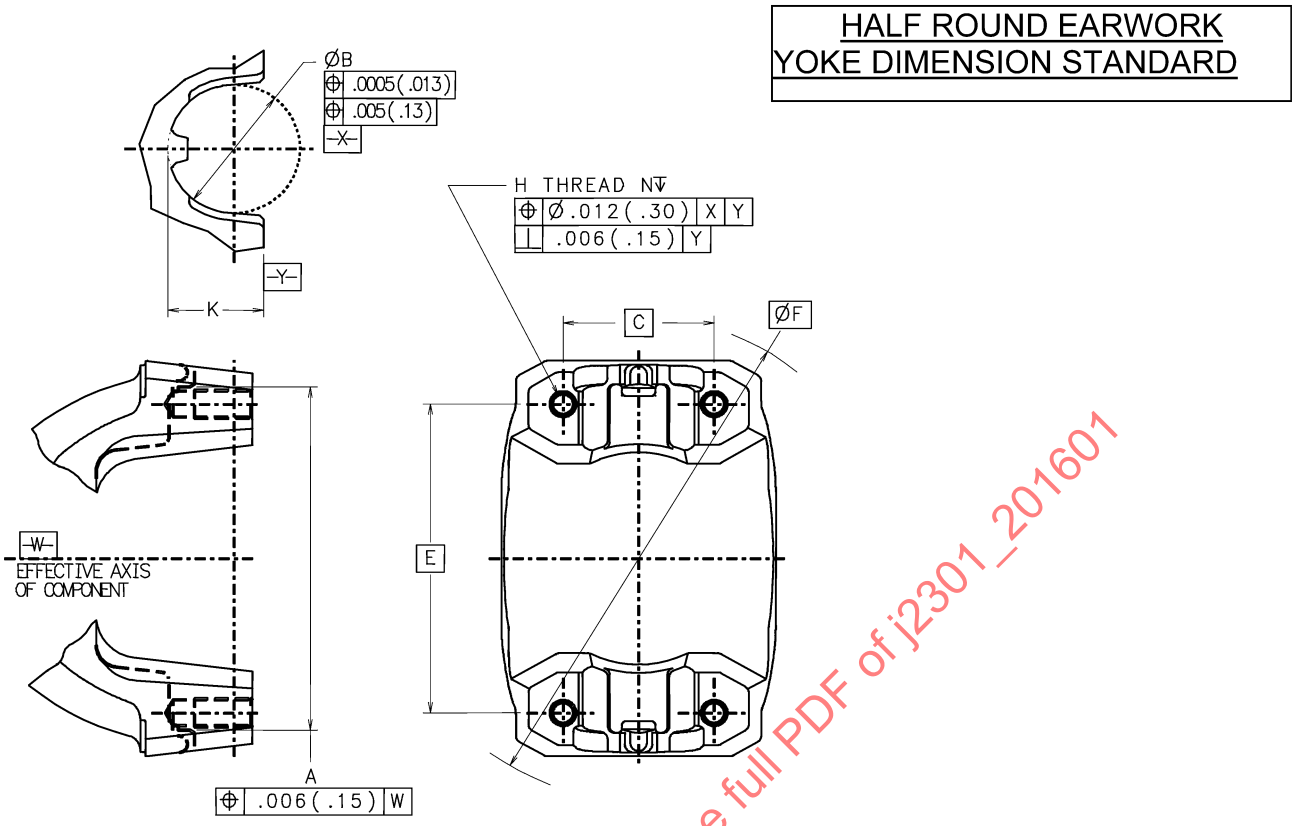

FIGURE 1—HALF ROUND EARWORK YOKE DIMENSION STANDARD (See Table 3)

TABLE 3—HALF ROUND EARWORK

SIZE	A ±0.001 (0.025)	B +0.0015 (0.038) –0	C Basic	E Basic	F Basic	H Thread	K ±0.002 (0.05)	N Depth
1310	3.219 (81.76)	1.062 (26.98)	1.580 (40.13)	2.908 (73.86)	4.00 (101.6)	0.250-28	0.565 (14.35)	0.62 (15.7)
1330	3.622 (91.99)	1.062 (26.98)	1.580 (40.13)	3.312 (84.12)	4.56 (115.8)	0.250-28	0.565 (14.35)	0.62 (15.7)
1350	3.622 (91.99)	1.187 (30.16)	1.800 (45.72)	3.188 (80.98)	4.56 (115.8)	0.312-24	0.628 (15.94)	0.75 (19.0)
1410	4.184 (106.27)	1.187 (30.16)	1.800 (45.72)	3.750 (95.25)	4.94 (125.5)	0.312-24	0.628 (15.94)	0.75 (19.0)
1480	4.184 (106.27)	1.374 (34.90)	2.125 (53.98)	3.688 (93.68)	5.31 (134.9)	0.375-24	0.721 (18.30)	0.75 (19.0)
1550	4.965 (126.10)	1.374 (34.90)	2.125 (53.98)	4.468 (113.49)	6.00 (152.4)	0.375-24	0.721 (18.30)	0.75 (19.0)
1610	5.311 (134.89)	1.875 (47.63)	2.500 (63.50)	4.800 (121.92)	6.75 (171.4)	0.312-24	1.313 (33.34)	0.75 (19.0)
1710	6.185 (157.09)	1.935 (49.20)	2.805 (71.25)	5.590 (141.99)	7.50 (190.5)	0.500-20	1.283 (32.58)	1.00 (25.4)
1760	7.093 (180.15)	1.935 (49.20)	2.805 (71.25)	8.500 (165.10)	8.38 (212.9)	0.500-20	1.283 (32.58)	1.00 (25.4)
1810	7.643 (194.12)	1.935 (49.20)	2.805 (71.25)	7.048 (179.02)	9.00 (228.6)	0.500-20	1.283 (32.58)	1.00 (25.4)

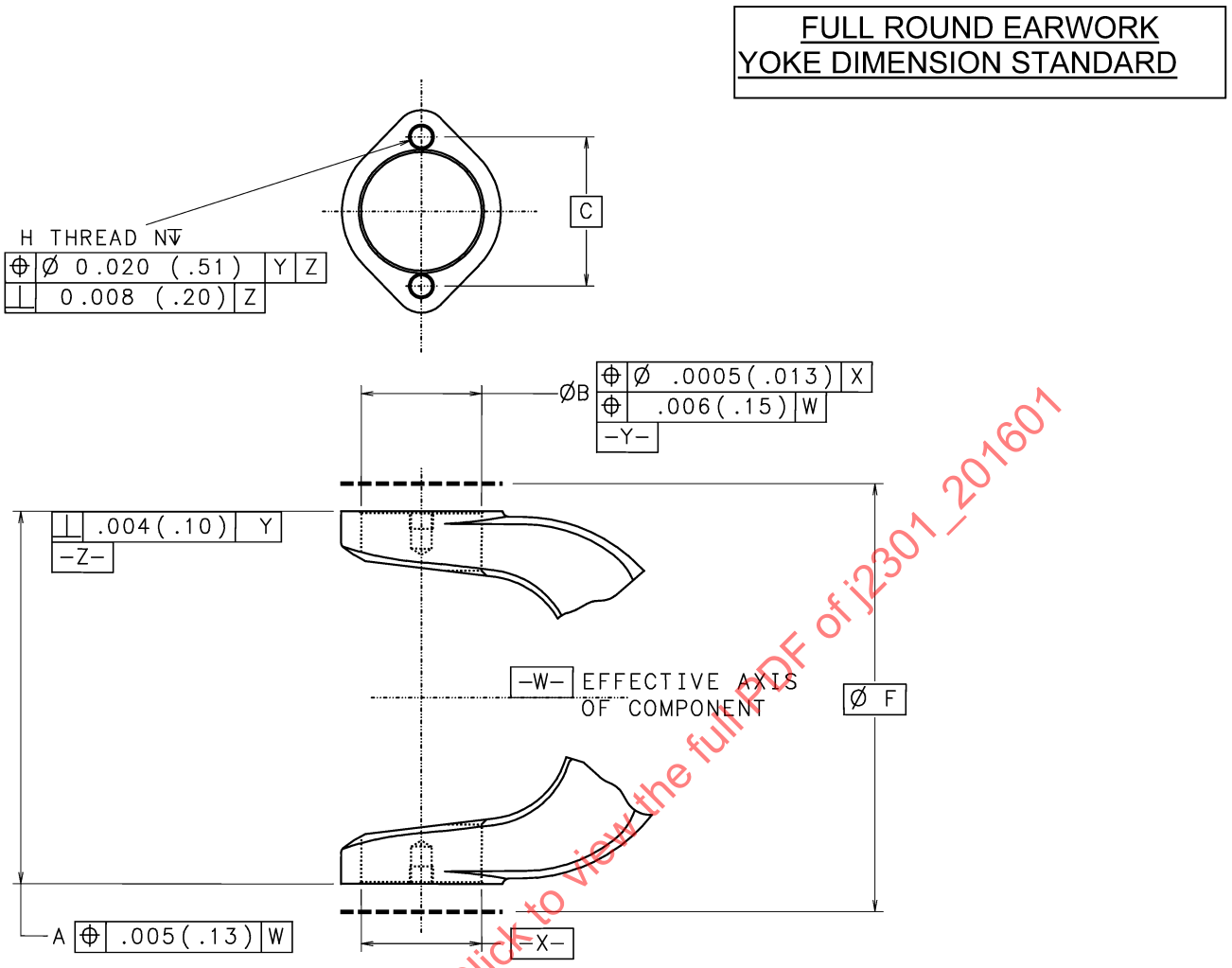

FIGURE 2—FULL ROUND EARWORK YOKE DIMENSION STANDARD (See Table 4)

TABLE 4—FULL ROUND EARWORK

SIZE	A ±0.001 (0.025)	B +0.0015 (0.038) –0	C Basic	F Basic	H Thread	N Depth
1610	5.311 (134.90)	1.8755 (47.638)	2.313 (58.75)	7.00 (177.8)	0.312-24	0.437 (11.1)
1710	6.185 (157.09)	1.9375 (49.212)	2.437 (61.90)	7.88 (200.2)	0.375-24	0.500 (12.7)
1760	7.093 (180.15)	1.9375 (49.212)	2.437 (61.90)	8.62 (218.9)	0.375-24	0.500 (12.7)
1810	7.643 (194.12)	1.9375 (49.212)	2.437 (61.90)	9.19 (233.4)	0.375-24	0.500 (12.7)
1880	8.094 (205.59)	2.1862 (55.530)	2.813 (71.45)	9.94 (252.5)	0.438-20	0.75 (19.1)