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PROVISIONAL
ACCEPTABLE MEANS OF COMPLIANCE

AEROPLANE STATIC PRESSURE SYSTEM

UNIFORM METHOD OF CALIBRATION OF POSITION ERROR

Prepared by the Airworthiness Committee and
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PROVISIONAL ACCEPTABLE MEANS OF COMPLIANCE

AEROPLANE STATIC PRESSURE SYSTEM - UNIFORM METHOD OF CALIBRATION OF POSITION ERROR

FOREWORD

1. The Standards in Annex 8, Airworthiness of Aircraft, are of the nature of broad specifications stating objectives rather than the methods of realizing those objectives. In order to indicate by example the level of airworthiness intended by the Standards of that Annex, some specifications of a more detailed and quantitative nature have been included in the same volume under the title "Acceptable Means of Compliance". The Foreword of Annex 8 indicates the obligation under the Convention, resulting from the introduction of Acceptable Means of Compliance.

2. When the Annex was adopted on 13 June 1957, the Standards on the subjects: Aeroplane Performance, Strength under Flight Loads, Reciprocating Engines, Turbine Engines, Propellers, and Navigation Lights were supplemented by Acceptable Means of Compliance. The absence of provisions of that type pertaining to other subjects was considered either as recognition, by the Council, that the Standards in themselves defined a sufficiently accurate level of airworthiness, or as recognition, by the Council, that due to the technical developments going on in a subject at the time of adoption, it had not yet been possible to establish a more precise technical specification than that in the Standards themselves.

3. It is the essence of the Acceptable Means of Compliance that they permit variations in overall method as well as in detailed application. Therefore, Contracting States, in establishing national codes that will ensure compliance with the Standards, will sometimes need guidance as to the departures from Acceptable Means of Compliance that are suitable for the certification of aircraft other than those specified in their Range of Validity, and also as to the use of methods developed too recently to have behind them the suitable background of experience deemed necessary for introduction of an Acceptable Means of Compliance.

4. That type of guidance material is established by ICAO as "Provisional Acceptable Means of Compliance", a class of specification that does not impose any obligation under the Convention. The Provisional Acceptable Means of Compliance are not, like the Standards or the full-fledged Acceptable Means of Compliance, established by agreement between Contracting States; instead, they reflect an agreement reached by an international body of experts to the effect that a specification is worthy of trial.

5. Trial application of Provisional Acceptable Means of Compliance in national regulations or practices is intended to build up the amount of experience that, eventually, could lead to the introduction of an Acceptable Means of Compliance on the same subject.

6. The Provisional Acceptable Means of Compliance presented in this Circular was developed by the Airworthiness Committee, a body of experts authorized by the Council and functioning under the Air Navigation Commission. The Airworthiness

Committee recommended the issuance of this Provisional Acceptable Means of Compliance in its report of the Seventh Meeting which was held from 22 November to 15 December 1966. The Air Navigation Commission, after satisfying itself that this Provisional Acceptable Means of Compliance is properly co-ordinated with the ICAO Standards and related material and that the policies of the Organization have been followed, authorized issuance of this Provisional Acceptable Means of Compliance at the Fourth Meeting of its Fifty-Fourth Session on 31 January 1967. It is to be noted that in so doing, the Air Navigation Commission did not pass judgement on, or endorse, the technical contents recommended by the Airworthiness Committee.

7. This Provisional Acceptable Means of Compliance is applicable to all aeroplanes certificated for operation at subsonic speeds up to an altitude of 15 000 metres (50 000 feet). It contains specifications concerning the calibration of the static pressure system position error of such aeroplanes. It also describes in detail the trailing cone calibration method which has been shown to meet the accuracy requirements of ±23 metres (±75 feet) throughout the prescribed operating altitude and airspeed/Mach number limitations and which has also proven to be an accurate, easily repeatable, relatively simple and economical method. The subject of this Provisional Acceptable Means of Compliance is one important factor directly related to the problem of vertical separation of aeroplanes.

8. It should be noted that States are being asked to conduct, on a sampling basis, static pressure system position error measurements of selected in-service aeroplanes using the trailing cone method, in order to gather additional data on this subject for evaluation by ICAO.

9. States are invited to use these specifications and to notify ICAO of the extent to which they are applied. Should any State find it desirable or necessary to adopt any significant variations from the specifications, that State is invited to notify the Organization of such difference.

AEROPLANE STATIC PRESSURE SYSTEM - UNIFORM METHOD OF CALIBRATION OF POSITION ERROR

APPLICABILITY

This PAMC contains specifications applicable to all aeroplanes certificated for operation at subsonic speeds up to an altitude of 15 000 metres (50 000 feet).

1. GENERAL

1.1 Introduction

This PAMC specifies a minimum accuracy required for calibration of the static pressure system position error of an aeroplane and details one acceptable method for uniform application.

1.2 Definitions

Static Pressure System Position Error: The difference between the altitude indicated by an altimeter (having no instrument error) connected to the static pressure system of the aeroplane and the ambient pressure altitude. It is convenient to consider the static pressure system position error as made up of the following two component parts:

a) the fixed error, which is recorded in the Aeroplane Flight Manual, and

b) the variable error, which is the probable departure from the fixed error. Included in the variable error is the error attributable to the test procedure used.

2. UNIFORM METHOD OF CALIBRATION OF POSITION ERROR

2.1 Any method of calibration of the aeroplane static pressure system position error should have an accuracy within ±23 metres (±75 feet) throughout the operating altitude and airspeed/Mach number limitations for which the aeroplane is certificated.

2.2 Calibration methods which have been shown to meet the accuracy requirements of para. 2.1 either by themselves or in combination with each other, including

a) Tower fly-past
b) Precision radar tracking
c) Trailing cone

can be applied provided they are correctly used so as to ensure compliance with para. 2.1.

2.3 There are two basic aspects of the problem of the aeroplane static pressure system position error calibration, namely:

a) calibration of the static pressure system position error for certification purposes, which is described in para. 3.3;

b) any necessary check-testing of the static pressure system position error of in-service aeroplanes, which is described in para. 3.4.

2.4 In order to ensure uniformity of calibration method, particularly in the case of para. 2.3 b) above, the trailing cone calibration method has been selected for presentation in this PAMC because of the advantages which are given below:

a) relatively high accuracy because the reference static pressure is measured by static orifice sleeve trailed at a certain distance behind the aeroplane where a free air stream condition exists. The difference between the pressure measured by the static pressure system in the aeroplane and the free air stream pressure is measured directly by means of a differential pressure instrument;

b) easy repeatability of the procedure;

c) simplicity of the test instrumentation and procedure;

d) economic operation.

2.5 A description of the trailing cone principle is given in para. 3.1.

3. TRAILING CONE CALIBRATION METHOD

3.1 General

3.1.1 Static pressure at an aeroplane flight altitude can be obtained with a high degree of accuracy by means of a static orifice sleeve incorporated in flexible nylon tubing extended behind the aeroplane. The tubing is kept straight and at approximately zero degree angle of attack by a non-lifting drag cone attached to the end of the tube. The tubing, static orifice sleeve and drag cone are called a "Trailing Cone" assembly. The trailing cone test equipment is specified in the Appendix. In essence it simply provides a distant static pressure port and should not be confused with other trailing systems, e.g. the trailing bomb. It can be used for flight calibration of an aeroplane static pressure system position error over the airspeed/Mach number-altitude flight envelope of the aeroplane.

3.1.2 The tubing transmits the free air stream static pressure (p) to an accurate, small range, differential pressure gauge which measures directly the static pressure system position error ($p_m - p$); p_m is "measured" static pressure from the aeroplane primary static pressure source, e.g. flush static ports or Pitot static tube. Because the aeroplane carries its own reference, pressure (p) from the trailing cone assembly, flight calibration is conducted without the aid of other aeroplane or special ground equipment and is not dependent on testing over specific geographical locations. A typical flight pattern for trailing cone flight calibration is shown on Figure 1; however, any suitable route may be used.

3.2 Installation

3.2.1 The preferred method of installation should be such that the nylon tube is continuous with no fittings between the cone assembly and attachment to the test instrumentation. Where, for installation or operating reasons, the nylon tube has to be interrupted at the attachment to the aeroplane, the fittings or unions used should have adequate mechanical strength and mate efficiently with the tubing to the trailing cone. The design drag load associated with this cone installation is approximately 90 kg (200 lb) at 400 kt indicated airspeed. Pipe dimensions etc. are shown in the Appendix.

3.2.2 For aft-engined aeroplanes it is strongly recommended that the assembly be towed from the fin tip. For aeroplanes with wing mounted engines, the lower aft fuselage extremities are recommended.

3.2.3 Free air stream static pressure is sensed by a trailing static orifice sleeve located in the nylon tubing at a sufficient distance ahead of the drag cone to eliminate pressure influence from the cone. The distance behind the aeroplane which it is necessary to extend the static orifice sleeve in order to obtain free air stream static pressure is dependent upon the size and geometric shape of the aeroplane, and can be determined by extending the nylon tubing (thereby increasing the distance of the trailing cone assembly behind the aeroplane) until the differential pressure stabilizes. At this point the static orifice sleeve has been properly positioned behind the aeroplane. For large turbo-jet aeroplanes this distance has been found to be approximately 40 metres (130 feet).

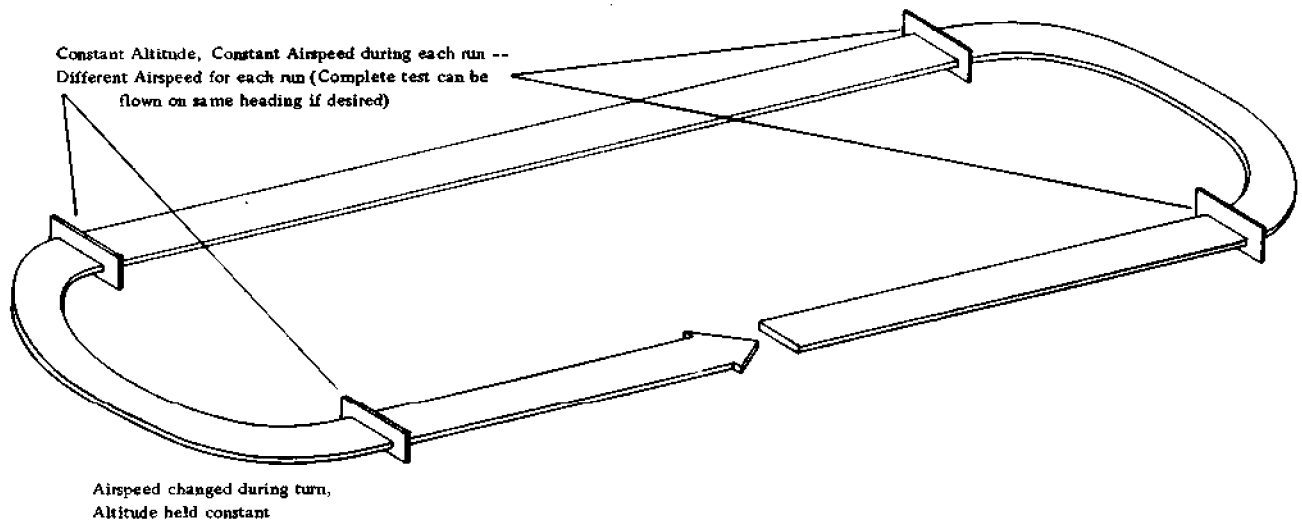


Figure 1

Typical Flight Pattern for Trailing Cone Method of Calibration of Position Error

3.3 Calibration for Certification Purposes

3.3.1 The flight test procedure for calibration of the aeroplane static pressure system position error for certification purposes is described below. A calibrated test altimeter and airspeed indicator will be required, as well as a differential pressure indicator as specified in the Appendix. The test altimeter and airspeed indicator are used to establish the test condition.

3.3.2 The following procedures should be carried out before flight:

a) A leakage test of the trailing cone system should be performed with the nylon tubing under approximately 45 kg (100 lb) tension and with the entire installation connected as to be used in flight. Negative pressure should be applied equal to the cabin pressure differential at the maximum test altitude. No noticeable leakage should be noted within one minute.

b) A leakage test of the aeroplane static pressure system should be performed in accordance with acceptable procedures. Any significant leakage should be eliminated.

c) The trailing cone system should be inspected for security of attachment, kinks in the tubing, straightness of the static orifice sleeve, damage or plugging of orifices and of the cone for general condition. The tubing should be laid out full length prior to flight to insure that no permanent set has taken place.

Note:- Care should be taken in storage of the nylon tubing. The bend radius during storage should be such that permanent deformation is not induced.

3.3.3 The distance of the static orifice sleeve behind the aeroplane needed to obtain free air stream static pressure should have been determined as in para. 3.2.3 with a serviceable trailing cone assembly. The calibration method should be as follows:

a) At the selected test altitude, a test airspeed is stabilized and maintained.

b) With level, unaccelerated flight being maintained, the following data should be recorded:

i) Differential pressure indicator reading;
ii) Test altimeter and airspeed indicator readings;
iii) Machmeter reading;
iv) Measured angle of attack and/or aeroplane weight;
v) Aeroplane configuration.

All instrument readings should be taken rapidly, preferably using automatic recording devices such as recording oscillographs.

Note:- The differential pressure indication should be stable for at least ten seconds before the time of reading because of pressure lag inherent in the trailing cone assembly. The trailing cone is also sensitive to control surface movements and control surfaces should be held steady while data is being recorded.

All instrument readings must be corrected for instrument error before final analysis.

c) Steps (a) and (b) are repeated for each airspeed calibration point at the test altitude. A recommended sequence is to calibrate at intervals from the lowest to the highest airspeed and then calibrate at the same airspeed points while decreasing airspeed. This increasing then decreasing airspeed sequence should be repeated a minimum of two times at each test altitude.

d) The above steps should be repeated for each test altitude and each aeroplane configuration.

3.4 Check Testing of In-service Aeroplanes

3.4.1 Trailing cone systems have been found acceptable for establishing aeroplane static pressure system position error for check testing purposes. The outlined test procedures are intended to be used in determining individual aeroplane static pressure system position error in the cruising regime of flight. The data thus obtained can be used for comparison with aeroplane static pressure system position error as shown in the aeroplane flight manual or, in the case of those aeroplanes equipped with air data systems applying static pressure system position error correction, comparison with the correction data utilized in these systems.

3.4.2 The system should be checked prior to flight in accordance with para. 3.3.2.

3.4.3 The static orifice sleeve should be a minimum of 40 metres (130 feet) aft of the most rearward point of the aeroplane unless a different length is specified by the aeroplane manufacturer.

Note:- 40 metres (130 feet) was selected to accommodate large transport category aeroplanes.

3.4.4 The flight test should be carried out as follows:

a) The aeroplane should be stabilized in steady level flight at a flight level between 300 and 350, if practicable. Where it is not practicable to conduct tests between the flight levels 300 and 350, they should be carried out at the highest practicable altitude.

b) At each of four Mach data points representative of and spaced over the normal operational speeds in level flight, altitude should be stabilized(within 0.5 m/s (100 ft/min) rate of climb or descent during the recording period) and a constant IAS held while recording data.

c) The following data should be recorded at each Mach data point:

i) Mach number and IAS from pilot's indicator;

ii) Altitude from pilot's altimeter with air data system correction or manual correction;

iii) Differential pressure (pilot's static pressure system to trailing cone system);

iv) Aeroplane weight during test period.

Note:- All readings should be recorded within the shortest possible time.

3.4.5 After landing a leakage test of the trailing cone system should be performed as in 3.3.2 a). If the flight test data appears to be questionable, the leakage tests of the aeroplane static pressure system as in 3.3.2 b) should be repeated.

3.4.6 The trailing cone system should be inspected for damage.

3.5 Precautions to be observed during Flight Tests

3.5.1 The following precautions should be observed during flight tests utilizing the trailing cone method:

a) It is important that the aeroplane be stabilized prior to and during recording data points. In recording data points, airspeed should be held within approximately ±2 kt for a 15 second period with the data point being recorded at the approximate 2/3 point of this period.

b) The aeroplane should be flown with zero side-slip.

c) Fluctuations of the differential pressure gauge are indications of possible cone instability which would invalidate test results.

d) To avoid the possibility of damaging the cone when taxiing, thus causing instability or malfunction of the cone in flight, care should be taken especially when taxiing to prevent such damage, i.e. a retractable system could be used, or the cone may be carried on a ground vehicle following the aeroplane to the take-off point.

4. APPLICATION OF THE CHECK TEST

Check tests should be carried out either when doubt arises about the correct functioning of the aeroplane static pressure system, or when modifications or repairs are made to the aeroplane structure which could affect the static pressure system.

APPENDIX*

SPECIFICATIONS FOR TRAILING CONE EQUIPMENT FOR AEROPLANE STATIC PRESSURE SYSTEM POSITION ERROR CALIBRATION BY MEANS OF THE TRAILING CONE METHOD

1. General

The specifications for the trailing cone equipment and information provided in the attached Douglas drawings (Figures 2,3 and 4) relate to two trailing cone systems, namely:

a) the standard systen (designated -1) and

b) the high-speed system (designated -501).

The standard system is designed for airspeeds up to 600 knots EAS and Mach numbers slightly greater than 1.0. The high-speed system is designed for airspeeds up to 800 knots EAS or Mach numbers up to 2.5. For the range of validity of this PAMC, only a) above, i.e. the standard cone/system, applies.

2. Specifications

2.1 Cone. This should be in accordance with the attached Douglas Drawing FT 7898765 (Figure 2), except that the material need not be "epoxy glass roving" and "epoxy unidirectional glass tape", provided the material is the equivalent in fibreglass/resin combination as to thickness and/or rigidity.

2.2 Static Orifice Sleeve, Cone and Line Assembly. This should be in accordance with the attached Douglas Drawing FT 7898766 (Figure 3), except that:

a) orifice holes should be precision-drilled;

b) orifice holes forward of the apex of the cone should be not less than the dimensions shown on the Douglas drawings.

2.3 Installation Techniques of the Trailing Cone System. These should be in accordance with the attached Douglas Drawing FT 7754389 (Figure 4).

2.4 Differential Pressure Gauge. An accurate, small-range differential pressure gauge should be used. The range should be sufficient to provide as much scale

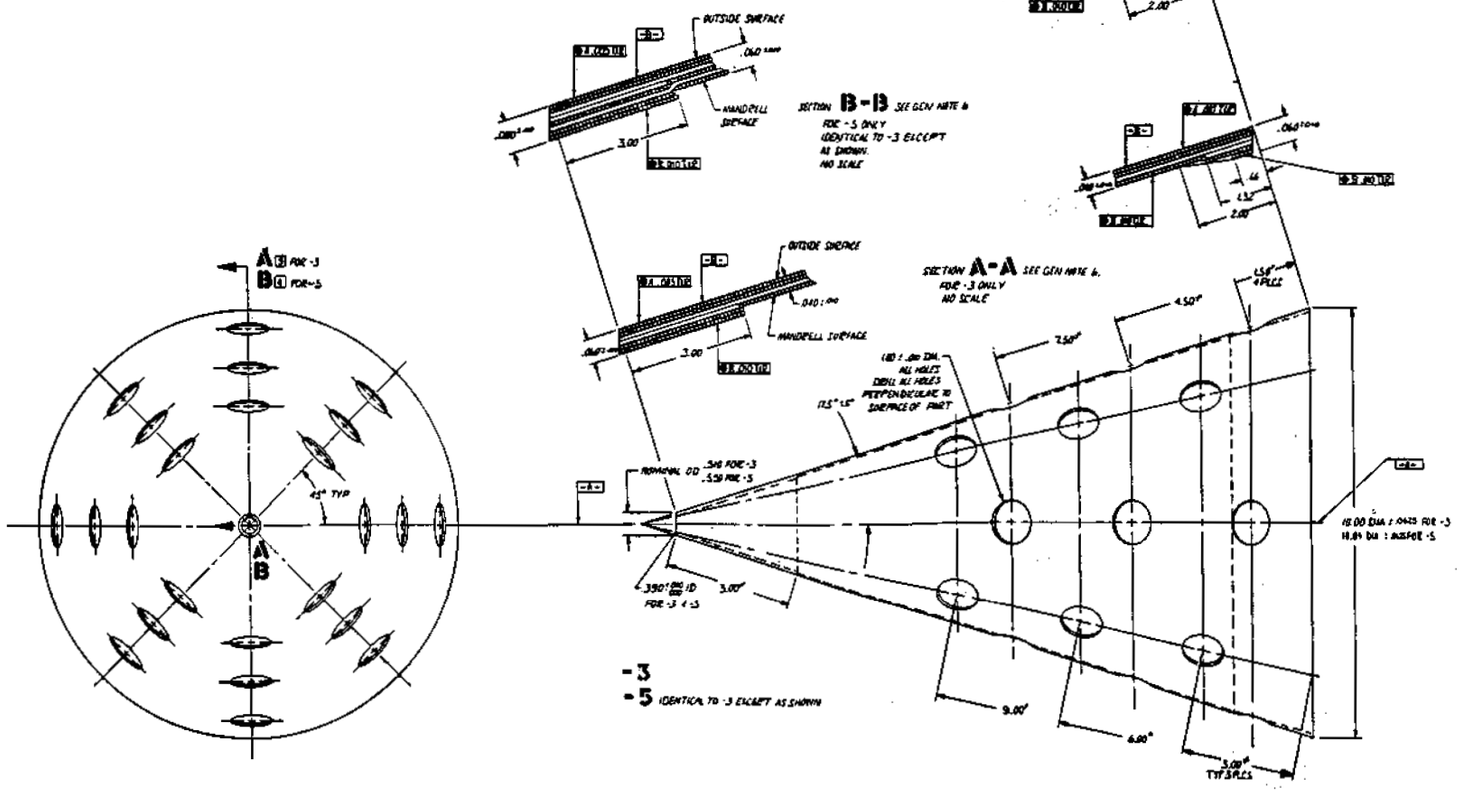
* Wording of the Appendix, as compared to that in the Report of the Airworthiness Committee Seventh Meeting (Doc 8653-AN/887), has been slightly changed to reflect amendments incorporated by the Douglas Aircraft Company in their drawings. The amended drawings were received from the company in March 1967.

resolution as possible and still cover the range of differential pressure expected for the aeroplane type being tested. The accuracy of the gauge should be ±4.5 metres (±15 feet) at full scale at the test altitude.

Note:- It is permissible to utilize two gauges (one in the trailing cone/pilot system and one in the trailing cone/co-pilot system) to avoid switching.

3. Acknowledgement

The equipment referred to in this Appendix is based on equipment designed by Douglas Aircraft Company, Inc., Long Beach, California, USA., to whom reference may be made for further information. The trailing cone assembly described here has known performance characteristics.



GENERAL NOTES:
UNLESS OTHERWISE SPEC:

1. RIBBON DIRECTION OF THE UNIDIRECTIONAL TAPE IS FROM THE BASE TO THE VERTEX.
2. TOLERANCES ON ALL DIMENSIONS ARE .062 UNLESS NOTED
3. USE LOWER WINDING TENSION ON INNER FIBERS (MANDRELL SURFACE).
4. FABRICATE PER D.P.S. 1465
5. SPECIFICATIONS DMS 1562
6. ⓐⓑ INDICATES 20 END GLASS ROVING.
   ▭ UNIDIRECTIONAL GLASS TAPE.
7. POST MFG. CURE CYCLE FOR -5 ONLY
   1 HR AT 300 F
   1 HR AT 325°F
   1 HR AT 350 F
   1 HR AT 375°F
   1 HR AT 400 F
   COOL SLOWLY TO BELOW 300°F
   AND REMOVE FROM OVEN
8. # INDICATES DIMENSIONS ON SURFACE OF PART.
9. PLACE PART NO., DATE STAMP AND INSPECTION STAMPS ON INSIDE SURFACE.
10. DIAMETERS MARKED THUS (Ø.XXX M A B) ARE CONCENTRIC TO NOTED DATUM WITHIN SPECIFIED TOL.

PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT NO.	STOCK SIZE	MATERIAL DESCRIPTION	MATERIAL SPECIFICATION	NUMBER
-5	CONE			1. B STAGE EPOXY RESIN IMPREGNATED GLASS ROVING	DMS 1562	
				2. B STAGE EPOXY UNIDIRECTIONAL GLASS TAPE FROM WIND ROVING ONLY		
				WE LOGISTICS STRATO-GLASS DIV. ARCADIA CALIF		
-3	CONE			1. B STAGE EPOXY RESIN IMPREGNATED GLASS ROVING	DMS 1562	
				2. B STAGE EPOXY UNIDIRECTIONAL GLASS TAPE FROM WIND ROVING ONLY	DMS 1562	

LIST OF MATERIALS

QUANTITY REQUIRED PER NOTED ASSY	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES FRACTIONS ± DECIMALS ± ANGLES ±	MATL WT EA STR CHK CHECK MFR ENGR STR ENGR MFGR APP'L	DOUGLAS AIRCRAFT DIVISION, MC LONG BEACH, CALIFORNIA
			DRAG CONE
SEE ENGINEERING RECORDS FOR USAGE DATA		DESIGN ACTIVITY APPROVAL	CODE IDENT NO. 88277 SIZE J FT 7898765
		CUSTOMER APPROVAL	SCALE SHEET

Figure 2

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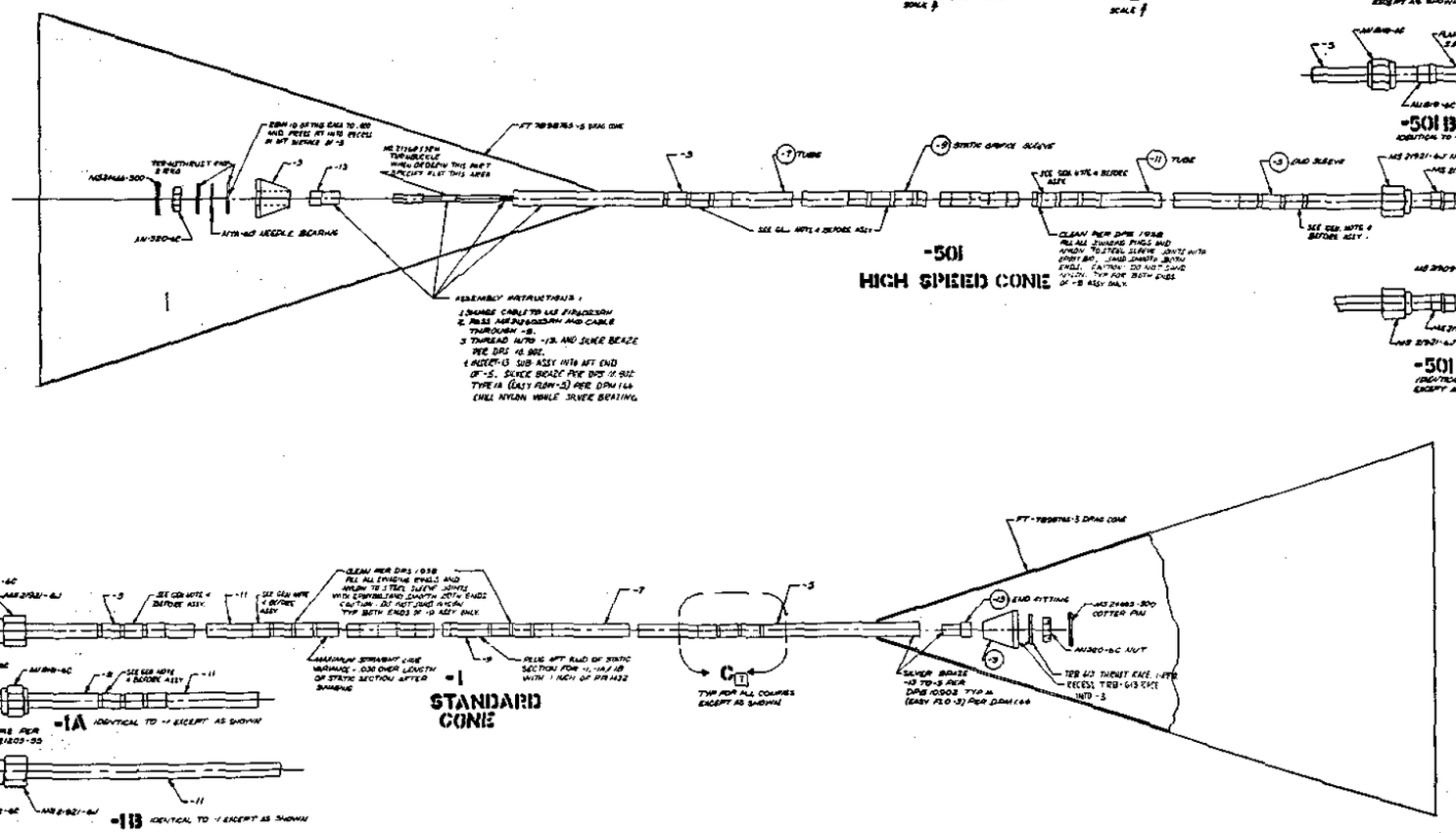

Figure 3

General Notes for
Figure 3 shown overleaf

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Figure 3

GENERAL NOTES:
UNLESS OTHERWISE SPECIFIED

1. ALL DIM ARE IN INCHES
2. AMOUNT OF COMPOUND TO BE DETERMINED ON ASSY.
3. ALL MACHINED SURFACES SHALL BE ✓ PER MIL-STD-10
4. EXCESS C-14 EPOXY B10 BONDING COMPOUND MAY CAUSE BLOCKING OF PASSAGE IN TUBING AFTER JOINING. USE COMPOUND SPARINGLY
5. LUBRICATE NTA-613 NEEDLE BEARING WITH POWDERED GRAPHITE.

MINIMUM TORQUE SPECS:

1. TIGHTEN ALL NUTS ON -501 SERIES TO 6-10 FLATS (1 COMPLETE TURN) PAST FINGER TIGHT
2. TIGHTEN ALL NUTS ON -1 & -1A CONFIG. TO 6-10 FLATS (1 COMPLETE TURN) PAST FINGER TIGHT
3. TIGHTEN ALL NUTS ON -1B CONFIG TO 6-14 FLATS (1 COMPLETE TURN +4 FLATS) PAST FINGER TIGHT

MANUFACTURING QUALITY ASSURANCE

I. INSPECT COMPLETE ASSEMBLY FOR CONFORMITY WITH DRAWING
II. STATIC ORIFICE SLEEVE
   A. THE STEEL STATIC SLEEVE SHALL BE STRAIGHT. THE MAXIMUM DEPRESSION OR BOW SHALL NOT EXCEED 0.03 INCHES FROM A STRAIGHT EDGE LAID AGAINST THE SLEEVE.
   B. THE ALIGNMENT OF THE STATIC SLEEVE WITH THE NYLON TUBING AT THE SWAGED FITTINGS SHALL BE STRAIGHT AND SMOOTH. NO VISIBLE OFFSET SHALL BE ALLOWED.
   C. THE FILLER AROUND THE SWAGING RINGS AND EACH END OF THE STATIC SLEEVE SHALL BE FLUSH WITH THE SLEEVE SURFACE.
   D. THERE SHALL BE NO DENTS ALLOWED ON THE STATIC SLEEVE.
   E. THE ORIFICE PATTERN SHALL BE SUCH THAT IN ANY GIVEN ROW AROUND THE STEEL TUBE THAT THE HOLES SHALL BE WITHIN ONE HALF HOLE WIDTH OR 0.09 INCHES CENTER TO CENTER.
   F. THE ORIFICES SHALL BE CLEAN SHARP EDGED AND UNBLOCKED.
III. LEAK CHECK
   A. THE COMPLETED SYSTEM SHALL BE LEAK CHECKED WITH SUCTION (BELOW ATMOSPHERE) PRESSURE OF 400 KNOTS + 15 KNOTS OR __ PSI + 0.5. NO LEAK SHALL BE PERMITTED FOR 5 MINUTES WITH STATIC PRESSURE.
IV. LAG CHECK

A PRODUCTION LAG CHECK SHALL BE CONDUCTED ON EACH COMPLETED CONE SYSTEM TO BE SURE IT FALLS WITHIN THE MAXIMUM ALLOWABLE RANGES. THE LAG CHECK WILL BE ACCOMPLISHED BY A BLOW-DOWN TECHNIQUE USING A __ CUBIC INCH TANK PRESSURIZED AT __ PSI WITH COMPRESSED AIR. THE TANK SHALL BE CONNECTED TO THE END FITTING ON THE CONE SYSTEM WITH A QUICK ACTION VALVE PLACED BETWEEN THE TANK AND THE FITTING. THE STATIC ORIFICES SHALL BE OPEN TO DISCHARGE THE AIR AND THE CONE SYSTEM STRETCHED OUT FULL LENGTH. THE VALVE SHALL BE QUICKLY OPENED AND THE TIME MEASURED FOR THE PRESSURE TO DECAY FROM __ PSI TO __ PSI.

THE MAXIMUM ALLOWABLE TIMES ARE

1. SYSTEMS WITHOUT CABLE (-1)
   - 50 FT __ SEC
   - 100 FT __ SEC
   - 200 FT __ SEC
2. SYSTEMS WITH CABLE (-501)
   - 50 FT __ SEC
   - 75 FT __ SEC
   - 100 FT __ SEC

STORAGE NOTE

THE COMPLETED SYSTEM SHOULD BE STORED IN NO LESS THAN A 4 FT DIA COIL. THE LAST 10 FT SHALL BE STORED STRAIGHT BY HANGING STRAIGHT DOWN SO AS NOT TO GET PERMANENT SET IN THE NYLON NEAR THE STATIC SLEEVE SECTION. IF REQUIRED THE SYSTEM SHALL BE COILED AND SHIPPED IN THE SPECIAL 4×4 BOX MFG ACCORDING TO DAL DWG C-1677. THE CUSTOMER WILL BE GIVEN INSTRUCTIONS TO STORE IN THE MANNER DESCRIBED ABOVE.

-50D	-50C	-50B	-50A	-501	-1B	-1A	-1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT NO	STOCK SIZE	MATERIAL DESCRIPTION	MATERIAL SPECIFICATION	FIND NO.
								C-14	BONDING COMP		SEE GENERAL NOTE NO. 2			
								B10	EPOXY BONDING		SEE GENERAL NOTE NO. 2			
1	1	1	1	1	1	1	1	MS 24665-300	COTTER PIN					5
1														
1	1	1	1	1				MS 20664C3	BALL SWAGE					4
1	1	1	1	1				MS 21260S3	TURNBUCKLE					7
	1	1				1		AN819-6C	SLEEVE					4
			1	1	1		1	MS 21922-6C	SLEEVE					5
1	1	1	1	1				AN 929-6C	CAP ASSY					4
	1	1	1	1	1	1	1	AN 320-6C	NUT					6
			1	1	1		1	MS 21921-6J	NUT					5
1	1	1				1		AN 818-6C	NUT					4
			1					MS21909-6C	TEE FITTING					4
				1				MS21912-6C	TEE FITTING					4
1		1						AN 804-6C	TEE FITTING					4
	1							AN 834-6C	TEE FITTING					4
2	2	2	2	2	1	1	1	TRB-613	THRUST RACE		TORRINGTON CO			8
1	1	1	1	1				NTA-613	NEEDLE THRUST BEARING		TORRINGTON CO. BEARING DIV 3837 E. WASHINGTON BLVD CITY OF COMMERCE, CALIF			[illegible]
1	1	1	1	1					CABLE		3/32 DIA	FLEX STL CABLE TIN COATED	MIL-W-1511 TYPE I CONST	
1	1	1	1	1				FT 7898765-5	DRAG CONE		AIR LOGISTICS STRATOGLASS DIV. ARCADIA, CALIF			
					1	1	1	FT-7898765-1	DRAG CONE		AIR LOGISTICS STRATOGLASS DIV ARCADIA, CALIF			
1	1	1						-17	WASHER		1/2 OD × 3/32	CRES BAR 321	QQ-S-763 CL-321 COND COLD FINISH	4
			1	1				-15	WASHER		[illegible] OD × .125	CRES BAR 321	QQ-S-763 CL-321 COND COLD FINISH	4
1	1	1	1	1	1	1	1	-13	END FITTING		[illegible] OD × .80	CRES BAR 321	QQ-S-763 [illegible]	[illegible]
1	1	1	1	1	1	1	1	-11	TUBE		[illegible] OD × .080 LENGTH SPEC BY CUSTOMER	NYLON [illegible] READING PA	[illegible]	5
1	1	1	1	1	1	1	1	-9	STATIC ORIFICE SLEEVE		3/16 OD × .020 × 16	CRES TUBE TYP 321	MIL-T-8808 COMP 321 TYPE I	6
1	1	1	1	1	1	1	1	-7	TUBE		3/16 × .080 × 72	NYLON [illegible] READING, PA	TYPE [illegible]	6
1	2	2	2	2	1	2	2	-5	SLEEVE		3/16 OD × .020 × 6	CRES TUBE TYP 321	MIL-T-8808 COMP 321 TYPE I	5
1	1	1	1	1	1	1	1	-3	NYLON INSERT		1/8 × 1 OD	NYLON ROD		[illegible]

QUANTITY REQUIRED PER NOTED ASSY

LIST OF MATERIALS

DASH NUMBERS OF THIS DRAWING ODD DASH NUMBERS SHOWN EVEN DASH NUMBERS OPPOSITE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES: FRACTIONS ± 1/32, DECIMALS ± .030, ANGLES ± 1/2°

SEE ENGINEERING RECORDS FOR USAGE DATA

FIRST RELEASE OF PRINTS — ORIGINAL DATE OF DRAWING — DESIGN ACTIVITY APPROVAL — CUSTOMER APPROVAL

DOUGLAS AIRCRAFT COMPANY, INC. LONG BEACH, CALIFORNIA

ASSY - TOWING CONE SYSTEMS

FLIGHT DEVELOPMENT

CODE IDENT NO 88277 — SIZE J — FT-7898766 — SHEET 1 OF 1

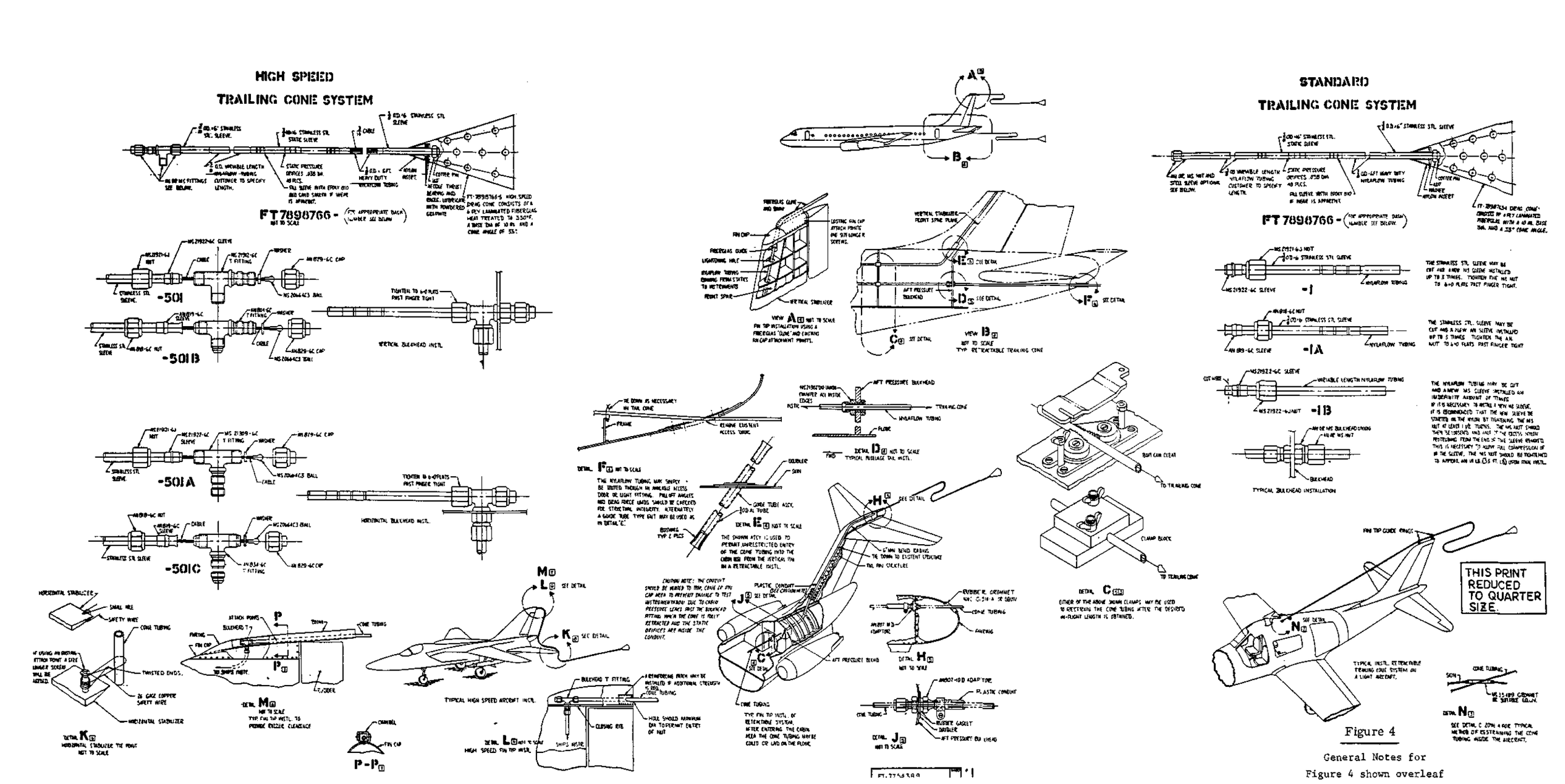
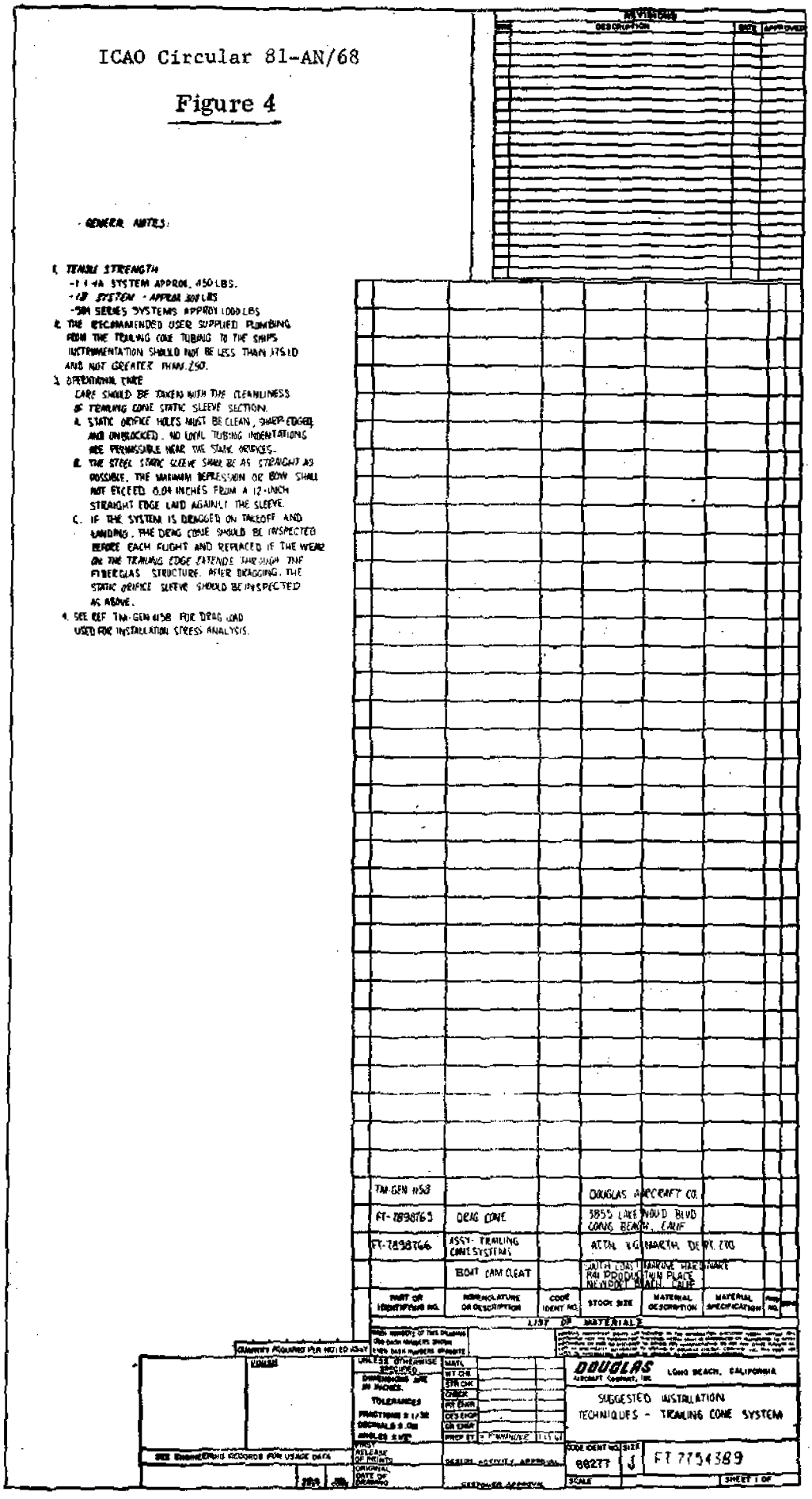


Figure 4

General Notes for
Figure 4 shown overleaf

ICAO Circular 81-AN/68

Figure 4



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PROCEDURES FOR AIR NAVIGATION SERVICES (PANS) are approved by the Council for world-wide application. They comprise, for the most part, operating procedures regarded as not yet having attained a sufficient degree of maturity for adoption as International Standards and Recommended Practices, as well as material of a more permanent character which is considered too detailed for incorporation *in an Annex, or* is susceptible to frequent amendment, for which the processes of the Convention would be too cumbersome. As in the case of Recommended Practices, the Council has invited Contracting States to notify any differences between their national practices and the PANS when the knowledge of such differences is important for the safety of air navigation.

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Report of the Seventh Meeting.
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(Doc 8653-AN/887). 153 pp. ..... U.S. $2.50

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