



SLOVENSKI STANDARD

SIST EN 4531-001:2017

01-marec-2017

Nadomešča:

SIST EN 4531-001:2012

Aeronavtika - Konektorji, optični, okrogli, z enim ali več zatiči, priključeni s tristopenjskim navojnim obročkom - Izravnani kontakti - 001. del: Tehnična specifikacija

Aerospace series - Connectors, optical, circular, single and multipin, coupled by triple start threaded ring - Flush contacts - Part 001: Technical specification

iTeh STANDARD PREVIEW

Luft- und Raumfahrt - Optische Rundsteckverbinder mit dreigängiger Schraubkupplung - Bündige Kontakte - Teil 001: Technische Lieferbedingungen

[SIST EN 4531-001:2017](#)

Série aérospatiale - Connecteurs optiques circulaires, mono et multibroche, à accouplement par bague fileté à trois filets - Contacts affleurants - Partie 001: Spécification technique

Ta slovenski standard je istoveten z: EN 4531-001:2017

ICS:

31.220.10	Vtiči in vtičnice, konektorji	Plug-and-socket devices. Connectors
49.060	Letalska in vesoljska električna oprema in sistemi	Aerospace electric equipment and systems

SIST EN 4531-001:2017

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 4531-001:2017](#)

<https://standards.iteh.ai/catalog/standards/sist/1cdb9608-b4e5-4505-8eff-4d651baed81d/sist-en-4531-001-2017>

EUROPEAN STANDARD

EN 4531-001

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2017

ICS 49.090

Supersedes EN 4531-001:2012

English Version

Aerospace series - Connectors, optical, circular, single and multipin, coupled by triple start threaded ring - Flush contacts - Part 001: Technical specification

Série aérospatiale - Connecteurs optiques circulaires, mono et multibroches, à accouplement par bague filetée à trois filets - Contacts affleurants - Partie 001: Spécification technique

Luft- und Raumfahrt - Optische Rundsteckverbinder mit dreigängiger Schraubkupplung - Bündige Kontakte - Teil 001: Technische Lieferbedingungen

This European Standard was approved by CEN on 29 July 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

	Page
European foreword.....	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	6
4 Description	6
5 Design.....	7
6 Definition drawings and masses.....	8
7 Tests.....	26
8 Quality assurance.....	31
9 Designation and marking.....	37
10 Packaging.....	37
11 Storage	37

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 4531-001:2017](https://standards.iteh.ai/catalog/standards/sist/1cdb9608-b4e5-4505-8eff-4d651baed81d/sist-en-4531-001-2017)

<https://standards.iteh.ai/catalog/standards/sist/1cdb9608-b4e5-4505-8eff-4d651baed81d/sist-en-4531-001-2017>

European foreword

This document (EN 4531-001:2017) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this European Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2017, and conflicting national standards shall be withdrawn at the latest by July 2017.

This document supersedes EN 4531-001:2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 4531-001:2017 (E)**Introduction**

This family of fibre optic connectors coupled by triple start threaded ring is derived from MIL-DTL-38999L series III and EN 3645-001. It is suitable for use on aerospace on-board applications.

Two variants of female insert are defined:

- Flush variant (A-Type female insert) is only possible with multimode contact;
- Recessed variant (B-Type female insert) is required for single mode contact.

The optical contacts are capable of accepting single cable sizes up to a maximum of 1,9 mm outside diameter.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 4531-001:2017](https://standards.iteh.ai/catalog/standards/sist/1cdb9608-b4e5-4505-8eff-4d651baed81d/sist-en-4531-001-2017)

<https://standards.iteh.ai/catalog/standards/sist/1cdb9608-b4e5-4505-8eff-4d651baed81d/sist-en-4531-001-2017>

1 Scope

This European Standard specifies the general characteristics, the conditions for qualification, acceptance and quality assurance, as well as the test programs and groups for threaded ring coupling circular fibre optic self-locking connectors, fire-resistant or non fire-resistant, intended for use in a temperature range from -65 °C to 150 °C (cable dependent) continuous.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 2591 (all parts), *Aerospace series — Elements of electrical and optical connection — Test methods*

EN 3197, *Aerospace series — Design and installation of aircraft electrical and optical interconnection systems*

EN 3645 (all parts), *Aerospace series — Connectors, electrical, circular, scoop proof, triple start threaded coupling, operating temperature 175 °C or 200 °C continuous*

EN 3909, *Aerospace series - Test fluids and test methods for electrical and optical components and sub-assemblies*

EN 4531-002, *Aerospace series — Connectors, optical, circular, single and multipin, coupled by triple start threaded ring — Flush contacts — Part 002: Specification of performance and contact arrangements*

EN 4531-101, *Aerospace series - Connectors, optical, circular, single and multipin, coupled by triple start threaded ring - Flush contacts - Part 101: Optical contact for EN 4641 multimode cable -55 °C to 125 °C - Product standard*

EN 4533-004, *Aerospace series — Fibre optic systems — Handbook — Part 004: Repair, maintenance and inspection*

EN 9133, *Aerospace series — Quality management systems — Qualification procedure for aerospace standard parts*

ISO 263, *ISO inch screw threads — General plan and selection for screws, bolts and nuts — Diameter range 0,06 to 6 in¹⁾*

EN 61300-3-33, *Fibre optic interconnecting devices and passive components — Basic test and measurement procedures — Part 3-33: Examinations and measurements — Withdrawal force from a resilient alignment sleeve using gauge pins (IEC 61300-3-33:2012)*

MIL-STD-1373, *Screw thread, modified, 60° stub, double²⁾*

MIL-DTL-38999L, *Connectors, Electrical, Circular, Miniature, High Density, Quick Disconnect (Bayonet, Threaded, or Breech Coupling), Environment Resistant with Crimp Removable Contacts or Hermetically Sealed with fixed, Solderable Contacts General Specification for²⁾*

¹⁾ Published as ISO International Standardisation Organisation <http://www.iso.ch/>.

²⁾ Published as DoD National (US) Mil. Department of Defense <http://www.defenselink.mil/>.

EN 4531-001:2017 (E)

MIL-I-81969/8-10, *Installing and removal tools, connector electrical contact, Types I and II, Class 2, composition A²⁾*

MIL-STD-454N, *Electronic equipment, Standard general requirements for²⁾*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 2591-100 apply.

4 Description**4.1 General**

The connectors utilise rear removable optical contacts with a ferrule diameter of 2,5 mm.

The receptacles and plugs contain either male insert or female insert. The female insert is characterized by its ability to precisely align the optical contacts.

The precise alignment of the optical contacts is accomplished by alignment sleeves.

The connectors are polarized by means of keyways and keys; polarization is obtained before the male contacts enter the insert of the female contacts and before the coupling ring is engaged. The position of the keying arrangement is given in 6.4.

The connectors with shell size 9, 11 and 13 are 100 % scoop proof.

The visual check of full mating is obtained by masking of a red coloured band on the receptacle.

4.2 Receptacle

<https://standards.iteh.ai/catalog/standards/sist/1cdb9608-b4e5-4505-8eff-4d651baed81d/sist-en-4531-001-2017>

The receptacle contains five keyways in which the keys of the plug engage. The main keyway is fixed and is wider than the others. Polarization is ensured by the different positions which the secondary keyways may take. The position of the insert is fixed relative to the main keyway.

4.3 Plug

The plug contains five keys which engage in the keyways of the receptacle. The main key is wider than the others. Polarization is ensured by the different positions which the secondary keys may take. The position of the insert is fixed relative to the main key.

The coupling ring permanently fitted on the plug enables the connectors to be mated and unmated. The internal thread of the coupling ring may be treated with a suitable lubricant compatible with the performance required in this European Standard.

4.4 Materials and surface treatment**4.4.1 General**

When dissimilar metals are in close contact, adequate protection against corrosion shall be used for the electromotive force of the cell not to exceed 0,25 V (see EN 3197).

4.4.2 Shells

The material of the connector shells and fittings shall be of suitable material and/or finish to protect against corrosion (see EN 3197) as specified in the product standard.

4.4.3 Optical contacts and alignment sleeves

The material of the optical contacts shall be of suitable materials as specified in the appropriate product standard. The optical contacts in both plug and receptacle are spring-loaded. The spring force is defined in the product standard. Alignment sleeves material shall be ZrO₂ (Zirconia).

Insert, seal, grommet and alignment pin materials shall have a hardness and mechanical characteristics consistent with the required use.

5 Design

5.1 Shells

The connector shells shall be in one inseparable unit. They contain teeth at the rear over the entire periphery and shall accommodate accessories. The receptacle shall be fitted with an internal seal for a good sealing of the coupled shells.

The jam nut receptacle shell shall contain an O-ring seal (panel seal). The lock nut shall be provided with wire locking holes.

Threads shall conform to standards ISO 263, except for the triple start threads, which shall conform to standard MIL-STD-1373.

The coupling ring shall be designed so that the optical contacts engage when it is screwed clockwise and disengage when it is unscrewed counter clockwise. The coupling ring shall be designed to provide a hand grip profile.

Full locking of the connectors shall occur at approximately 360°. On completion of tightening of the coupling ring, mechanical contact shall exist between the receptacle and plug shells. Masking of a red colour band on the receptacle shall show that the connectors are correctly mated.

The front face of the plug shell shall seal when fully mated with the receptacle connector.

5.2 Inserts

The insert carrying the optical contacts shall be in hard material and have a cross section and radii such that no cracks, flaking or breaks can occur in normal operation.

The insert for contacts shall be non-removable; it shall be mechanically held in the shell. Sealing shall be provided between the shell and insert.

The mechanical contacts retention system shall be integrated in the hard insert.

The design shall permit individual installation of the contacts without removal of the insert.

Insertion and removal of the contacts shall be from the rear. For ease of operation, tools according to MIL-I-81969/8-10 standard (P/N for size 12) may be used.

Contact position identification shall be permanent and contrasted on the front face of the insert and on the rear face of the insert or grommet.

The male insert shall incorporate two optical contact alignment pins for multiway connectors. The alignment pins improve the guiding of the inserts before optical contacts touch each other. The female insert shall incorporate two optical contact alignment holes for multiway connectors and a guiding sleeve in each female insert cavity.

EN 4531-001:2017 (E)

Two variants of female insert are defined:

- Flush variant (A-Type female insert) is only possible with multimode contact. The zirconia sleeve withdrawal force measured under EN 61300-3-33 conditions shall be [1,9 N to 3,5 N];
- Recessed variant (B-Type female insert) is required for single mode contact. The zirconia sleeve withdrawal force measured under EN 61300-3-33 conditions shall be [1,9 N to 3,5 N] for B-Type insert cavity.

6 Definition drawings and masses

6.1 General

General dimensions and masses of receptacle, plug and protective cover are given in the product standards.

6.2 Receptacle mating dimensions

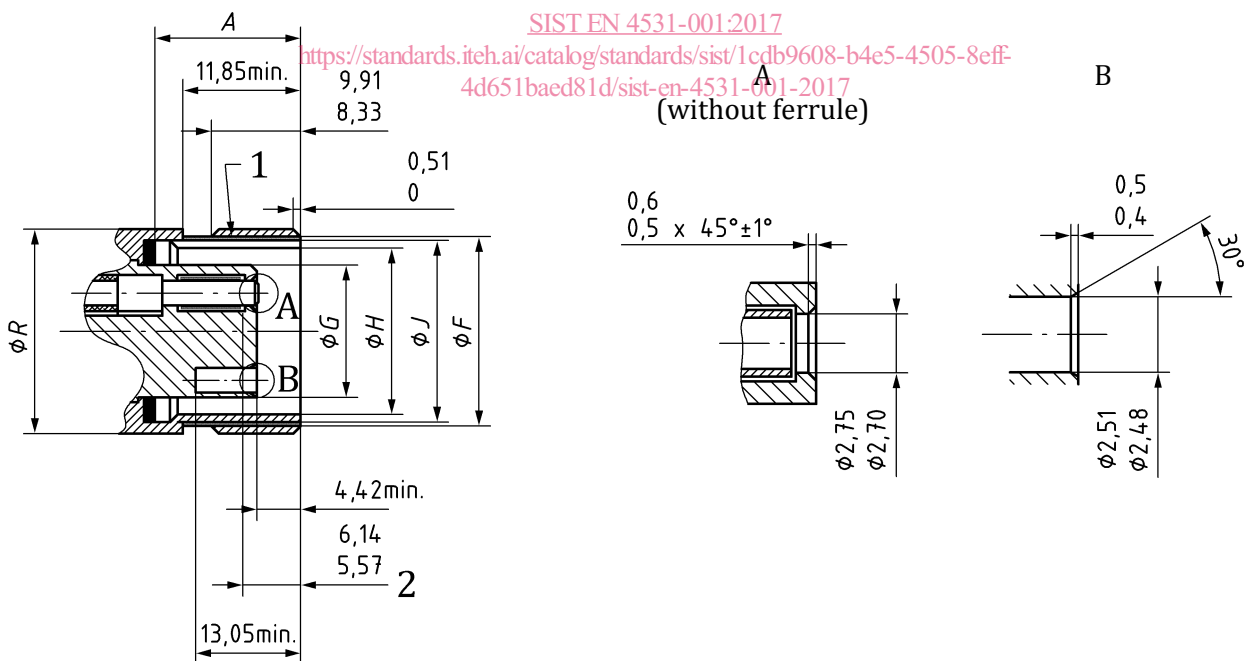
6.2.1 Receptacle with female insert

The mating dimensions of receptacles with female insert are shown in Figure 1 for shell sizes 11, 13, 15, 19, 21, and 25, Figure 2 for shell size 9 and Table 1.

Same dimensions as EN 3645 connectors.

STANDARD PREVIEW
(standards.iteh.ai)

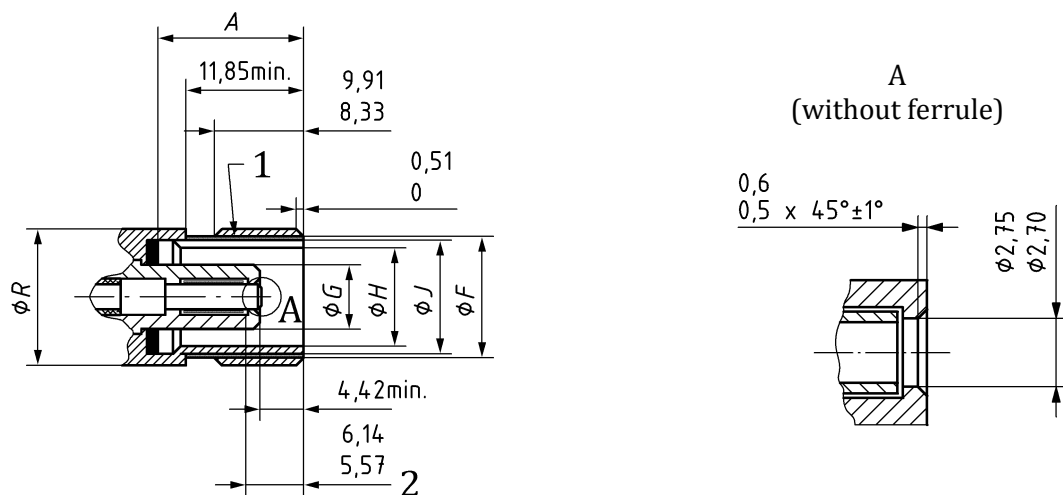
Dimensions and tolerances are in millimetres.



Key

- 1 Thread
- 2 When sleeve is in rear position

Figure 1 — Drawing for shell sizes 11, 13, 15, 19, 21 and 25



Key

- 1 Thread
- 2 When sleeve is in rear position

Figure 2 — Drawing for shell size 9

iTeh STANDARD PREVIEW

Table 1

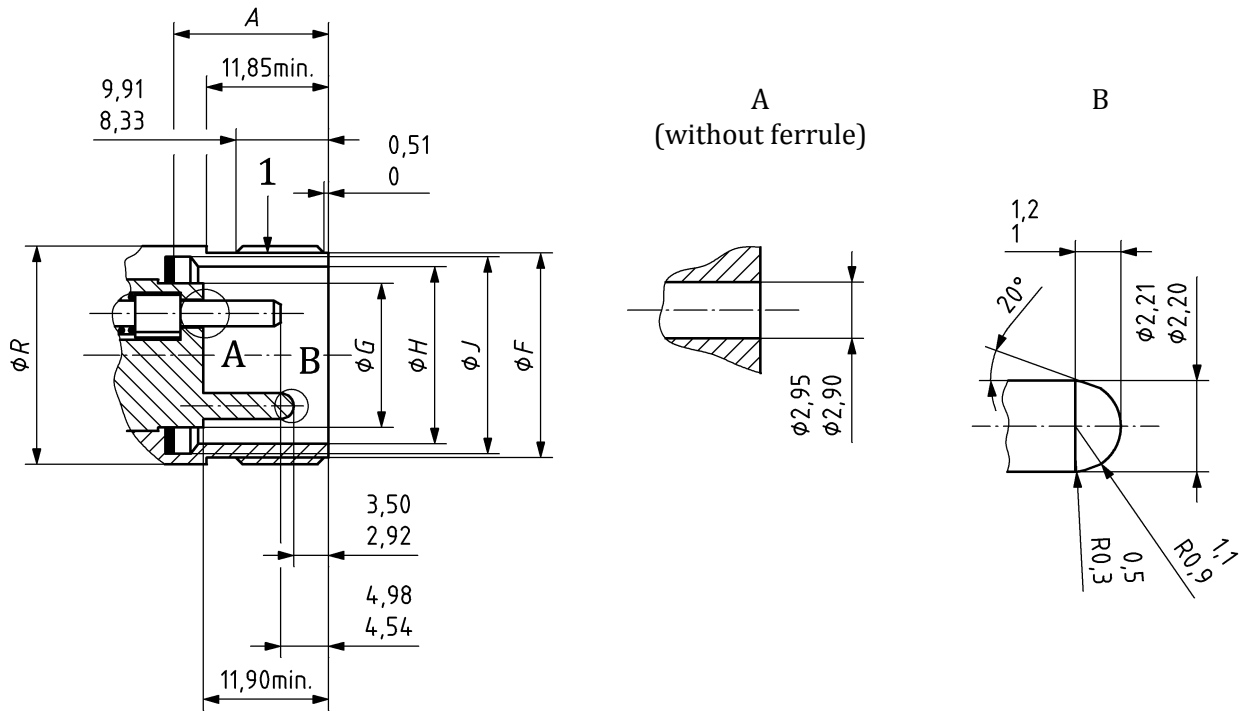
Shell size	A gask loc	$\varnothing F$	$\varnothing G$	$\varnothing H$	$\varnothing J$	$\varnothing R$ max.
9		14,42 14,14	7,24	11,36 11,20	12,63 12,34	15,88
11		17,60 17,32	10,49	14,61 14,45	15,88 15,60	19,05
13		20,77 20,49	13,39	17,45 17,30	19,66 19,38	22,23
15	14,73 14,50	23,95 23,67	16,56	20,63 20,44	22,84 22,56	25,40
19		29,89 29,56	22,00	26,47 26,31	28,63 28,40	31,75
21		33,07 32,74	25,17	29,64 29,49	31,85 31,57	34,73
25		39,42 39,09	31,52	35,99 35,84	38,20 37,92	41,28

6.2.2 Receptacle with male insert

The mating dimensions of receptacles with male insert are shown in Figure 3 for shell sizes 11, 13, 15, 19, 21, and 25, Figure 4 for shell size 9 and Table 1.

Same dimensions as EN 3645 connectors.

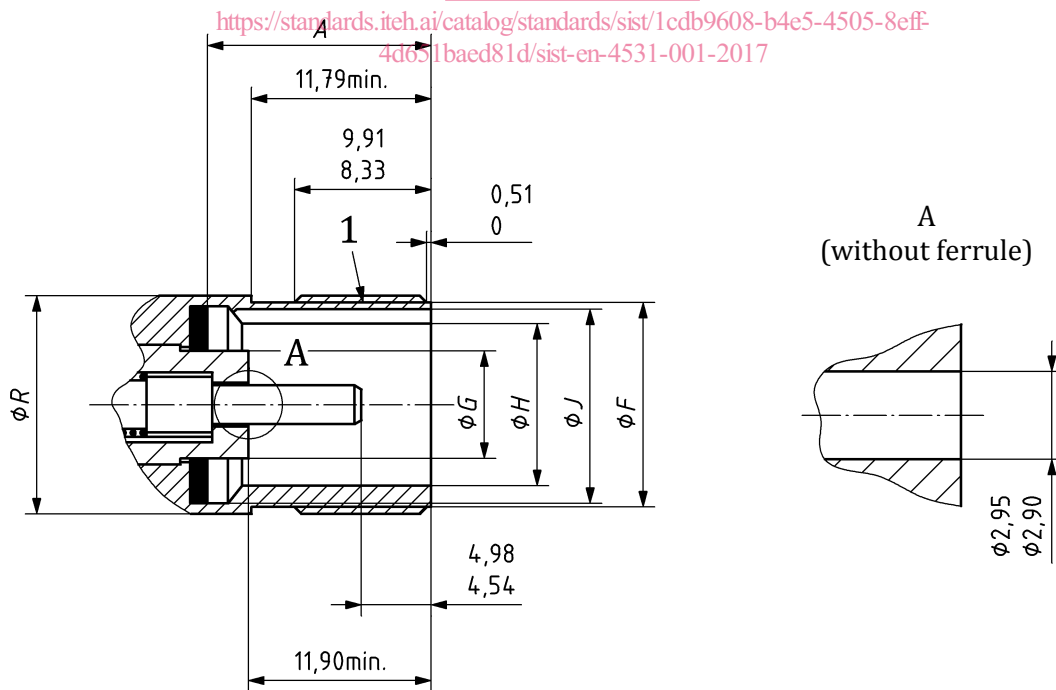
Dimensions and tolerances are in millimetres.



Key
1 Thread

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Figure 3 — Drawing for shell sizes 11, 13, 15, 19, 21 and 25



Key
1 Thread

Figure 4 — Drawing for shell size 9