



DPC: 24/30439799 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 03 January 2024

Origin: International

Latest date for receipt of comments: 26 February 2024

Project No. 2021/01644

Responsible committee: PSE/17/2 Transmission pipelines

Interested committees:

Title: Draft BS EN ISO 22504 Oil and gas industries including lower carbon energy - Pipeline transportation systems. Onshore and offshore pipelines pig traps design requirements.

Please notify admin.start@bsigroup.com if you are aware of any keywords that might assist in clarifying or identifying the standard or of the content of this standard:

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD. THIS DRAFT IS NOT CURRENT BEYOND 26 February 2024

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <https://standardsdevelopment.bsigroup.com/>.

E-mail: admin.start@bsigroup.com

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

DRAFT INTERNATIONAL STANDARD

ISO/DIS 22504

ISO/TC 67/SC 2

Secretariat: UNI

Voting begins on:
2024-01-03

Voting terminates on:
2024-03-27

Oil and gas industries including lower carbon energy — Pipeline transportation systems — Onshore and offshore pipelines pig traps design requirements

ICS: 75.200

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.



Reference number
ISO/DIS 22504:2024(E)

AVA Documents
Document Sharing Hub
© ISO 2024



COPYRIGHT PROTECTED DOCUMENT

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
4 Design and manufacture	4
4.1 Required information.....	4
4.2 Design.....	4
4.3 Welding.....	8
4.4 Stress relieving.....	9
4.5 Hydrostatic test.....	9
4.6 Painting and coating.....	9
4.7 Marking.....	9
5 Pig trap system layout	11
Annex A (normative) Guidelines for Subsea pig traps	16
Annex B (normative) Information provided by the purchaser	20
Annex C (normative) Tables and Figures for pig traps and layout	21
Annex D (informative) Suggested dimensions for pig traps	33
Annex E (normative) Pig guide bar in branch connection	36
Annex F (informative) Internal tray	41

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO *had not* received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

Technical Committee ISO/TC 67, Oil and gas industries including lower carbon energy, Subcommittee SC 2, Pipeline transportation systems.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document is not a design manual; rather, it is intended for use in conjunction with sound engineering practice and judgment. It must be used in conjunction with the standards of the pipeline and piping to which the pig trap is connected.

Oil and gas industries including lower carbon energy — Pipeline transportation systems — Onshore and offshore pipelines pig traps design requirements

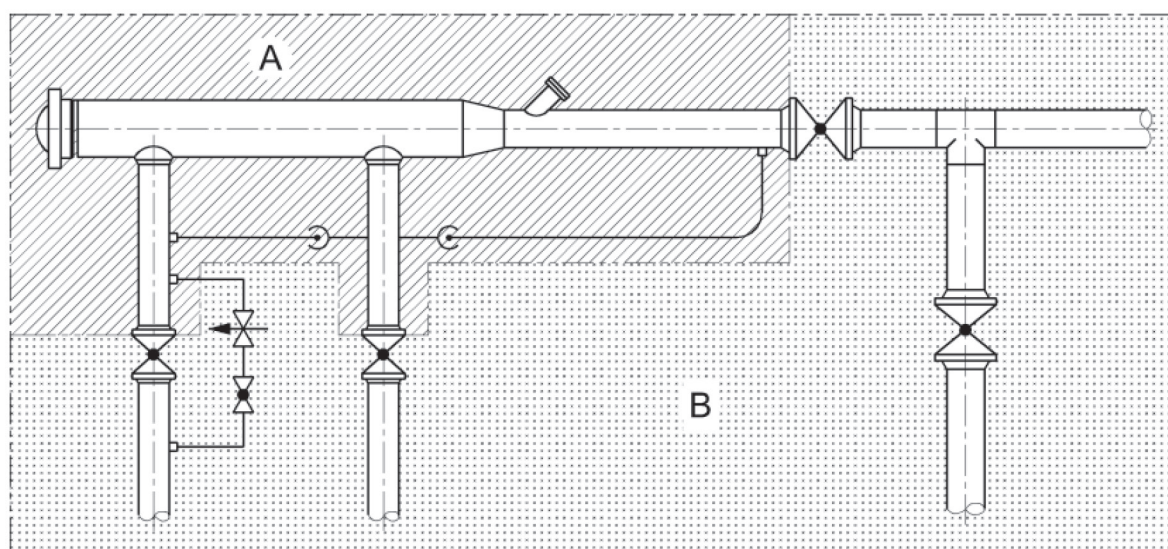
1 Scope

1.1 This document provides basic requirements for design, manufacturing, and layout of onshore and offshore pig traps allowing entry to a pipeline for the launching and receiving of pigs, inspection tools and other equipment to be run through a pipeline, together with the associated pipework, valves and instrumentation.

1.2 This document does not apply to installations for automatic pig traps.

1.3 This document does not apply to self-contained pigging valves.

1.4 Figure 1 defines the application limit for the content of Design and Manufacturing ([Clause 4](#)) and Layout ([Clause 5](#)).



NOTE 1 Zone A corresponds to the components of the pig trap that are designed and manufactured as prescribed in [Clause 4](#).

NOTE 2 Zone B corresponds to the components of the pig trap system that are added to the pig trap during its installation, as prescribed in [Clause 5](#).

NOTE 3 The branches for instruments, vents and drains are considered in Zone A to an extent of up to 150 mm or up to the flange connection. The completion of these facilities is considered as belonging to Zone B.

Figure 1 — Extent covered by [Clauses 4](#) and [5](#)

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel*

ISO 13623, *Petroleum and natural gas industries — Pipeline transportation systems*

ISO 13628-8, *Petroleum and natural gas industries — Design and operation of subsea production systems — Part 8: Remotely Operated Vehicle (ROV) interfaces on subsea production systems*

ISO 13628-15, *Petroleum and natural gas industries — Design and operation of subsea production systems — Part 15: Subsea structures and manifolds*

ISO 13847, *Petroleum and natural gas industries — Pipeline transportation systems — Welding of pipelines*

ISO 14313, *Petroleum and natural gas industries — Pipeline transportation systems — Pipeline valves*

ISO 14723, *Petroleum and natural gas industries — Pipeline transportation systems — Subsea pipeline valves*

ISO 15590-2, *Petroleum and natural gas industries — Factory bends, fittings and flanges for pipeline transportation systems — Part 2: Fittings*

ISO/IEC 17024, *Conformity assessment — General requirements for bodies operating certification of persons*

ASME BPVC Section VIII – Division 1 and 2, *Rules for Construction of Pressure Vessels*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

automatic launcher

device that allows the automatic launching of pigs into a pipeline, provided with specific piping arrangements, in accordance with the service or manufacturer

3.2

converging “Y”

fitting connecting two pipelines to a third one and which allows the passage of pigs through the point of intersection among the pipelines

3.3

closure of the trap

device connected to the major barrel, utilized for the safe opening and closing of the pig trap

3.4

explosive decompression

increase in volume presented by plastic materials when rapidly exposed to atmospheric pressure after a long period of contact with high pressure vapor liquids or pressurized gases. The expansion occurs by the vaporization of the liquid or decompression of the gas absorbed by these materials

3.5**foam pig**

pig manufactured of polyurethane foam, with the capability of passing through severe obstructions in the pipeline

3.6**full bore valve**

valve that permits an unobstructed passage, and with the same inside diameter along its entire length

3.7**internal tray (basket)**

removable cylindrical device used in receiver traps to keep the foam pig retained in the major barrel, to facilitate its removal

3.8**launcher trap (launcher)**

device that allows the launching of pigs

3.9**launcher-receiver trap (launcher-receiver)**

device that allows the launching or receiving of pigs

3.10**major barrel**

portion of the pig barrel that has the greatest diameter, from where the pig is inserted or removed

3.11**minor barrel**

portion of the pig barrel that has the smallest diameter, equal to the pipeline diameter

3.12**pig diverter**

fitting connecting a pipeline to other pipelines and which allows the selective passage of pigs, allowing them to be directed to the selected pipeline

3.13**pig trap**

device connected to the ends of a pipeline or sections of pipeline allowing entry for the launching and receiving of pigs, inspection tools and other equipment to be run through a pipeline, composed of: major barrel, minor barrel, quick opening closure, kicker branch, bypass branch and other branches for instruments, drains, vents, etc.

3.14**pig trap system**

a pig trap with associated pipework, valves and instrumentation

3.15**pipeline code**

the standard utilized to design the pipeline

3.16**piping code**

the standard utilized to design the piping system

3.17**processed gas**

natural gas treated by a process of removal of the heavier components. This gas is composed basically of methane.

3.18

shared launcher

device intended to launch pigs in pipelines connected by means of a pig diverter or a similar fitting

3.19

receiver trap (receiver)

device that allows the receiving of pigs

3.20

shared receiver

device intended to receive pigs from pipelines connected through a converging “Y” or similar fittings

3.21

skidded trap

Prefabricated pig trap assembly to be easily fitted into position and connected to the system

3.22

through conduit valve

full bore valve with an unobstructed and continuous cylindrical opening

4 Design and manufacture

4.1 Required information

[Annex B](#) contains a list of information to be supplied by the purchaser for the pig trap.

4.2 Design

4.2.1 The pig traps can be of the launcher, receiver or launcher-receiver types. [Figures C.1](#) to [C.3](#) of [Annex C](#) present schematic diagrams with the configuration of the pig traps. The main components indicated in these Figures are listed in [Table C.1](#).

4.2.2 The dimensions of the pig traps, referenced in [Figures C.1](#) to [C.3](#), shall be defined by the purchaser. As a reference, [Tables D.1](#), [D.2](#), or [D.3](#) of informative [Annex D](#) provide dimensions that may be used for the pig traps.

4.2.2.1 Special attention shall be given in sizing the kickers and drain diameters, considering the characteristics of the fluid and flow speed.

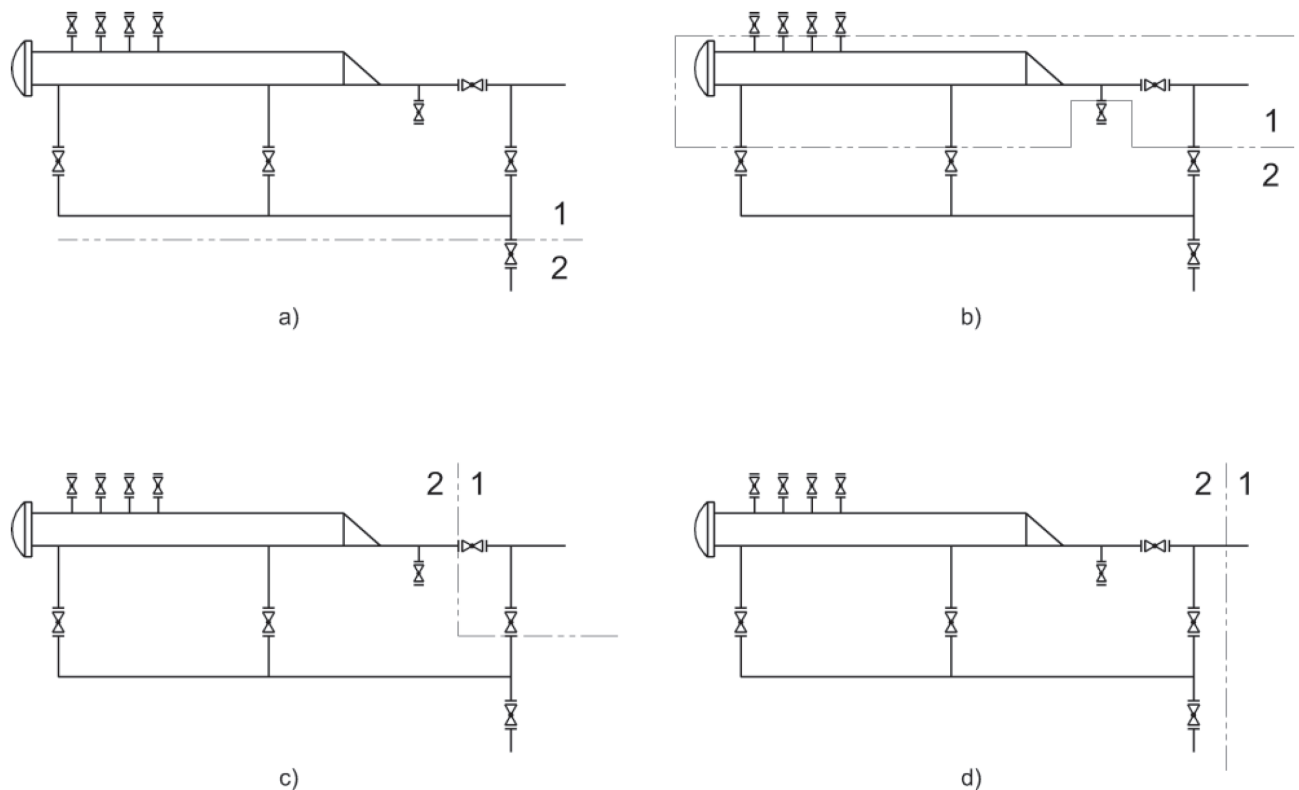
4.2.2.2 Operational aspects such as pigging scope, frequency of use, fluid characteristics and design life time shall be considered.

4.2.2.3 [Annex A](#) provides guidelines for the design of subsea pig traps.

4.2.3 The material properties and sizing of the wall thicknesses of the pig trap shall be in accordance with the pipeline design standard, unless otherwise specified by the purchaser.

4.2.3.1 The pig trap shall be in accordance with the pipeline design pressure and temperature. The designer should consider any special conditions foreseen during Pipeline lifetime.

4.2.3.2 Possible code breaks are reported in [Figure 2](#). Recommended is type “a”; type “b” is accepted for skidded pig traps, type “c” is not recommended; type “d” is not recommended for onshore and topside offshore pig traps.



Key

- 1 pipeline code
- 2 piping code

Figure 2 — Possible code breaks configurations: a) Type “a” Recommended code break configuration, b) Type “b”, c) Type “c” Not recommended, d) Type “d” Not recommended for onshore and topside offshore pig traps

4.2.4 The closure of the pig trap shall be of the quick opening type, provided with hinge or other mechanism capable of supporting the moving part during the opening and closing of the closure, and be equipped with a pressure warning device which prevents opening of the closure when the pig trap is pressurized.

4.2.4.1 This should include an interlock arrangement with the main pipeline valves.

4.2.4.2 The design and manufacturing of the closure shall be in accordance with ASME BPVC Section VIII – Division 1.

4.2.4.3 The closure shall include redundancy in the mechanical design so that the failure of a single component does not lead to failure of the closure.

4.2.4.4 The closure shall have a locking device to ensure uniform tightness and integrity along the entire sealing region.

4.2.4.5 The closure shall be provided with an activation mechanism that allow the operation to be executed by a single person, in a maximum time of five minutes and with no additional tool beyond those provided or specified by the closure manufacturer.

4.2.4.6 The closure shall be girth-welded to the end of the major barrel of the pig trap.

4.2.4.7 Closures provided with threaded doors, yoke type or incorporating screw thread expanders (e.g. ratchet binders) in conjunction with external clamps shall not be used.

NOTE The top ratchet binder that holds the clamp rings is vulnerable to failure, especially if the pressure warning lock through the clamp ring lugs is not installed properly.

4.2.4.8 The closure shall have a sealing ring, of a material compatible with the product transported in the pipeline, which ensures pressure-tight seal, varying from atmospheric pressure to the pig trap design pressure. In the case of high vapor pressure products (LPG, natural gas, etc), the material of the sealing ring shall also have the feature of explosive decompression resistant.

4.2.4.9 The inside diameter of the closure hub should be equal to the inside diameter of the major barrel. If the use of different diameters is necessary, the inside diameter of the closure hub shall maintain the clearance defined in [4.2.6](#).

4.2.4.10 The yield strength of the material of the closure hub should be equal to that of the major barrel. If the use of a material with lower yield strength is necessary, the thickness of the closure hub shall be adjusted for this condition.

NOTE Whenever lower yield strength is used, the maximum ratio between the thickness of the closure hub and that of the major barrel, as defined in the pig trap installation design standard, shall be considered.

4.2.5 The reducer shall be manufactured in accordance with ISO 15590-2.

4.2.5.1 The reducer of the launcher and the launcher-receiver trap shall be eccentric.

4.2.5.2 The reducer of the receiver trap should be concentric.

4.2.5.3 For a launcher or launcher-receiver installed in a vertical position, the reducer of the trap shall be concentric.

4.2.5.4 The included angle of the reducer shall be smaller than or equal to the value that provides a maximum slope of 1:5 (see [Figure 3](#)) along its entire length.

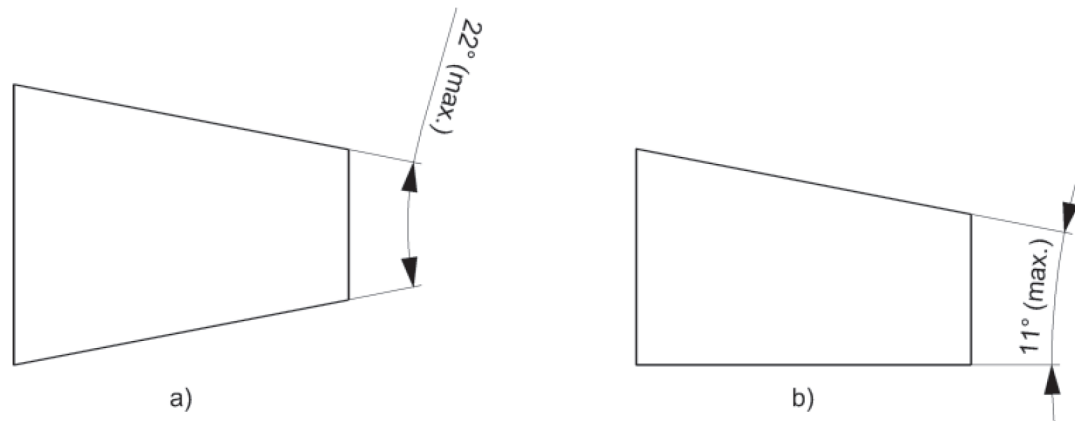


Figure 3 — Maximum included angle of the reducers: a) Concentric reducer, b) Eccentric reducer

4.2.6 The inside diameter of the major barrel shall have a minimum clearance in relation to the smaller inside diameter of the pipeline, corresponding to the smaller of the following values: 25 % of the outside diameter of the pipeline or 89 mm (3 1/2 in).

4.2.7 The kicker or bypass branches (item 17 of [Figures C.1 to C.3](#)) and the main line branch (item 18 of [Figures C.6 to C.8](#)) should be located horizontally (3 or 9 o'clock positions) or on the top of pipe (12 o'clock position). The branches shall not be located on the bottom of pipe (6 o'clock position) or in any descending position.

NOTE The longitudinal weld of the major barrel should not coincide with the kicker or bypass branches.

4.2.8 The kicker or bypass branches in the receivers and the launcher-receivers with an outside diameter equal to or greater than the half of the smallest outside diameter of the pipeline shall be provided with guide bars, according to [Annex E](#).

4.2.9 The inside diameter of the minor barrel should be equal to the inside diameter of the pipeline adjacent to the receiver or launcher trap, with no obstructions that might hinder the passage of the pig.

4.2.10 The preparation of the ends of the components to be welded shall conform to the applicable design standard in accordance with the selected code break configuration (see [Figure 2](#)).

4.2.11 A balancing line shall be installed in launcher and the launcher-receiver traps to equalize the pressure between the major barrel and the minor barrel, according to item 11 of [Figures C.2, C.3](#) and [C.5](#). The nominal diameter of the line shall be of 25 mm (1 in) for pipelines with a nominal diameter of up to 150 mm (6 in) and of 50 mm (2 in) for larger nominal pipeline diameters.

4.2.11.1 The diameter of the balancing line shall be large enough to prevent blockage by debris in the system.

NOTE For balancing lines with a long length, the installation of an intermediate support might be necessary.

4.2.12 The pig trap shall have branches for the pressure equalization line (item 10 of [Figures C.1 to C.3](#)), vents (item 8 of [Figures C.4](#) and [C.5](#)), pressure indicators (item 15 of [Figures C.4](#) and [C.5](#)), drains (item 7 of [Figures C.4](#) and [C.5](#)), nitrogen injection (item 14 of [Figures C.4](#) and [C.9](#)) and sampling outlet (item 13 of [Figures C.4](#) and [C.9](#)).

4.2.12.1 Unless otherwise specified by the purchaser, these branches shall have a length of 150 mm.

4.2.12.2 Unless otherwise specified by the purchaser, branches, including those for instrument connections, shall be a minimum of DN50 (NPS 2).

NOTE Connections smaller than DN 50 (NPS 2) have lower mechanical strength and are vulnerable to premature failure due to factors such as external impact.

4.2.12.3 The branches for the pressure equalization line and drains shall have a flanged end. Other branches shall have a capped end.

4.2.12.4 The longitudinal weld of the major and minor barrel shall not coincide with the branches hole.

4.2.12.5 The completion of these branches shall be executed in the installation stage, according to [5.12](#) to [5.17](#).

4.2.13 A thermal relief valve (item 9 of [Figures C.1](#) to [C.3](#)) shall be installed in the major barrel of pig traps of pipelines designated for the transportation of products in a liquid state or that contain a liquid phase.

NOTE The thermal relief valve can be replaced by another device which executes the same function.

4.2.14 If specified by the purchaser, intelligent launcher and launcher-receiver traps in pipelines with nominal diameter equal or larger than 150 mm (6 in), may have a flanged nozzle (item 12 of [Figures C.2](#) and [C.3](#)), with a nominal diameter of 50 mm (2 in), to facilitate the pig insertion into the minor barrel, with the help of a pulling cable. This nozzle shall be installed horizontally (3 or 9 o'clock positions), sloped at 45°.

4.2.15 When the pig trap is submitted to stress relieving and an intrusive type of pig passage indicator is used (item 16 of [Figures C.1](#) and [C.3](#)), the pig trap shall be provided with a branch for this instrument.

4.3 Welding

4.3.1 Unless otherwise specified by the purchaser, welding shall be in accordance with ISO 13847.

4.3.2 All welded joints, including those of the reducer and the seam weld of pipe manufactured from plate, shall be traceable and have their nondestructive testing recorded in the final documentation.

4.3.3 Inspection

4.3.3.1 The welding inspectors shall be certified in accordance with ISO/IEC 17024 or an equivalent certification.

4.3.3.2 The nondestructive testing inspectors shall be certified in accordance with ISO 9712 or an equivalent certification.

4.3.3.3 Unless otherwise specified by the purchaser, at least the following tests shall be executed on each pig trap:

- a) 100 % visual inspection of all welded joints;
- b) 100 % magnetic particle inspection of all angled joints, such as welded branches and fittings. Whenever magnetic particle inspection is not possible because of the diameter or the material, liquid penetrant testing shall be performed;
- c) 100 % radiographic examination of all girth joints (butt weld). Ultrasonic examination with permanent digital records may be used as an alternative to the radiographic examination.