

SPECIFICATION FOR TEXTILE BARRIER FACE COVERINGS

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1. INTRODUCTION

This specification was created at the request of BRC members and was designed to meet the following criteria:

- Had to be able to use readily available textile testing methods and test equipment
- Should not impact on the important testing of PPE and medical devices
- Should keep testing lead times and costs to a minimum

2. SCOPE

This specification is for both single use (disposable) and re-useable textile face coverings intended to be used by the general public, including children. This type of face covering is intended to be used in public places including whilst travelling or at their normal place of work where the use of filtered personal protective face masks or surgical masks is not required. These face coverings do not provide any protection against infective agents such as viruses, but are intended to cover the mouth, nose and chin areas and provide protection again liquid droplets.

The purpose of such face coverings is to protect other persons from potential spread of infection by the wearer rather than to the protect the wearer from infection from other persons.

Face coverings covered by this specification are not intended to be used in medical or surgical environments as they are not intended to provide protection against fine mist particles of liquid, dusts or viruses. Face coverings intended to be used in medical or health care environments or used as personal protective equipment (PPE) are outside the scope of this specification.

Attention is drawn to Annex A which provides the rationale behind the development of this specification.

NOTE: This specification has been developed in support of mass manufacture of textile barrier face coverings of the sort advocated by UK Government in its daily briefing on 4th June 2020. However, BRC is cognizant of work currently being undertaken in Europe in relation to the development of a specification for face coverings to be worn by the general public that has broad Europe-wide acceptance but which is based on a different testing approach to that set out in this specification. BRC is engaged in discussions with regard to the ongoing European work as to the most appropriate requirements for a specification for such products.

3. DESIGN

- The design of the face coverings shall be such that they cover the whole of the mouth, nose and chin areas of the face.
- Face coverings shall be provided with a suitable means of securing around the wearer's head. This shall be one of the following methods:
 - a minimum of 4 ties intended to be tied at the back of the head (2 per side), or
 - one or more elasticated bands, one at the top and one near the bottom, intended to be passed around the head, or
 - 2 ear loops, or
 - One or more touch and close fasteners that have the facility to be adjustable
- The face covering may include a adjuster (nose clip) in the nose bridge area to provide for close fitting of the face covering around the bridge of the nose. If the nose adjuster is made from metal then it shall be secured within a fabric channel so that the adjuster is not in direct contact with the skin. Plastic nose adjusters may be in direct skin contact but must be securely attached to the face covering in at least 3 places to ensure a good fit around the bridge of the nose.
- Any means of adjustment of size shall be designed for the comfort of the wearer.
- Face coverings should not contain seams in the mouth or nose area but where such seams are included then they shall meet the requirements for water penetration resistance.
- Face coverings shall be washable at a temperature of not less than 60 °C.
- Any loose threads or loose ends shall not exceed 10mm in length.
- Face coverings must not contain small parts or be adorned with any attachments (e.g. buttons or beads) that may product a choking hazard.
- Face coverings shall be made from fabrics which do not readily shed fibres in use.

NOTE: Most textile materials will shed some fibre but the use of pile or brushed surface fabrics such as fleece should be avoided as they are more likely to shed fibres which can be inhaled

4. ADDITIONAL DESIGN REQUIREMENTS APPLICABLE TO FACE COVERINGS INTENDED FOR USE BY CHILDREN

- a. Face coverings intended for use by children shall comply with the requirements of BS EN 14682 and shall take the guidance given in CEN/TR 16792 into account.
- b. The use of face coverings is not recommended for children under 2 years and the choice of design, in particular relating to the means of attachment to the head, should be carefully considered in relation to its appropriateness for younger children.

NOTE: There is currently some debate as to the age from which the use of face coverings by children is deemed appropriate and it is for each manufacturer /retailer to determine the age appropriateness of each specific design taking into account the likely and foreseeable behaviours of children.

- c. The use of elastic ear cords is not recommended nor is the use of ties in face coverings intended to be worn by children under the age of 7 years.
- d. The use of face coverings with a nose bridge is not recommended for face coverings intended for use by children.

5. PERFORMANCE REQUIREMENTS

Face coverings shall meet the requirements in Table 1.

6. CHEMICAL REQUIREMENTS

The materials from which face coverings are made shall comply with the requirements of relevant EU Regulation as applicable e.g. 1907/2006 (REACH) including Entry 72 of Annex XVII, Persistent Organic Pollutant Regulations 850/2004, Biocidal Products Regulation 528/2012, etc.

In addition, the face coverings shall comply with the chemical requirements given in Table 1.

7. LABELLING

The following information shall be marked on the face covering or included on a permanent label. The information shall be legible and durable to repeated laundering.

- a. Sizing
An indication of their size or other indication of the end user for which they are suitable (i.e. shall indicate their suitability for children and/or adult or indicate a sizing such as S/M/L, etc)

- b. The fibre content (in accordance with EU Regulation 1007/2011)
- c. The manufacturer’s name or brand and postal address (minimum of UK postal code) shall be given
- d. Care instructions including the instruction ‘Do not dry clean’. Care instructions may be given using the care symbols as specified in BS EN ISO 3758.
- e. A statement to the effect of ‘This face covering is not personal protective equipment or a medical device’.
- f. For face coverings intended to be worn by children, the statement “WARNING: Not suitable for children under 2 years”

NOTE: The use of sewn-in labels is permitted but it is recommended that the labels is not positioned so as to lay against the inner surface of the face covering as this may cause irritation to the wearer

The following information may be provided on the product or on its packaging:

- a. Product identification and/or batch number
- b. Country of origin
- c. Where appropriate, an indication of any age-relating warning regarding the suitability for use by children who cannot use them correctly without assistance.
- d. A statement to the effect children wearing face coverings should be supervised at all times.
- e. A statement to the effect that face coverings should not be worn by any person who may have breathing difficulties whilst wearing a face covering and/or whilst carrying out strenuous activities which may affect breathing rates.
- f. Instructions for the correct use of the face covering including putting the face covering on/removing after wear
- g. An indication of the nominal maximum recommended duration of wear.

NOTE: UK Government guidelines published on 11th May 2020 advises that the wearer washes their hands or uses hand ‘sanitiser immediately before putting the face covering on and immediately after taking it off after use. Immediately after removing the user should avoid touching the face covering, especially the front or the part that has been in contact with the mouth and nose and the face covering should immediately be placed directly into a plastic bag until the wearer has the opportunity to wash the face covering. In addition. users should avoid touching their eyes, nose or mouth and all times. In addition, the user should make sure to clean any surface touched by the face covering.

TABLE 1: PERFORMANCE REQUIREMENTS

Parameter	Test method	Requirement (minimum unless stated otherwise)	Notes applicable
Fibre Composition	EU Regulation 1007/2011	Single fibres: No tolerance Blends: ± 3%	
Air Permeability	BS EN ISO 9237 Tested before and after 5 washes	>5 mm/s	1, 4, 5
Aqueous Liquid Repellency (Outer fabric only)	BS ISO 23232 Tested before and after 5 washes	Grade 4	4
Resistance to Water Penetration (Outer fabric and seams only)	BS EN ISO 811 Tested before and after 5 washes. Rate of rise 10 cm/ min	Basic performance: >20 cms H2O High performance: >100 cms H2O Seams: > 20 cms H2O”	4
Fastening Attachment Strength	CEN/TR 16792 Annex B	>70 N	
Colour Fastness to Water	BS EN ISO 105-E01	Colour change 4 Staining 3-4	4
Colour Fastness to Washing	BS EN ISO 105-C06, C1M	Colour change 4 Staining 3-4	4
Colour Fastness to Rubbing	BS EN ISO 105-X12	Dry 4 Wet 4	
Colour Fastness to Light	BS EN ISO 105-B02	Blue Wool Standard 4	4
Dimensional Stability to Laundering	BS EN ISO 6330, Cycle 6N & tumble dry	Woven and non-woven: ± 3% Knitted: ± 5%	4
Wire penetration	Annex B	> 90 N	2
Sharp points	BS EN 71-1	No sharp points	2
Sharp edges	BS EN 71-1	No sharp edges	2
pH	BS EN ISO 3071	4.5 to 7.5	
Formaldehyde, free and hydrolysed	BS EN 14184-1	<20 mg/kg	3
Migration of elements after extraction using artificial saliva solution (inner surface only)	BS EN 16711-3	Cadmium <0.05µg/cm²/hour Chromium <0.05 µg/cm²/hour Lead < 0.05 µg/cm²/hour Arsenic < 0.05 µg/cm²/hour	
<div>1. Test shall be carried out on finished article and air permeability measured through the number of layers forming the mask. Stitching, pleats, etc shall not be removed before testing. The air flow shall be measured 5 times from each side to ensure both air ingress and air egress.</div> <div>2. Only required when a mask contains an encased wire or other semi-rigid material (e.g. at bridge of nose) to help form good seal around mouth and nose area</div> <div>3. The requirement for free and hydrolysed formaldehyde is lower than the limit specified in EU Regulation 1907/2006 Annex XVII Entry 72. This is intentional due to the likely duration of skin contact and the location of use (around mouth and nose).</div> <div>4. Not required for single use (disposable) face coverings</div> <div>5. Materials meeting the differential pressure requirements given in EN 14683 shall be considered to have met this requirement.</div>			

ANNEX A (INFORMATIVE): RATIONALE

The following document provides some additional information regarding the rationale used for the development of this specification for textile barrier face coverings and for the inclusion of the various requirements and test methods chosen.

1. GENERAL

The face coverings covered by this specification are not intended to replace the medical, surgical or filtered PPE masks that are required to be used in hospitals and other high risk environments such as healthcare. They are meant only to provide a low level barrier for the general public against liquid droplets that may be transmitted when in public places and/or whilst travelling in open places. They are not intended to provide any protection against sub-micron size viruses or bacteria.

As of 4th June 2020, UK Government was advocating in its daily briefing the mandatory use of non-medical face coverings on public transport in England with effect from 15th June 2020. Such masks offer “some, albeit limited, protection” and was described as ‘the kind of face covering you can easily make at home’. This specification is intended to apply to face coverings of the type being described by UK Government but which are mass manufactured for sale to the general public.

The face coverings may be made of a variety of materials and using any appropriate design of the face covering such as to allow an element of fashion whilst still being capable of being washed in the consumer’s home.

These articles are intended for ‘private use’ by consumers and do not provide protection against atmospheric conditions of an extreme nature.

As such they fall outside the scope of the EU Regulations on Personal Protective Equipment (2016/425) and are no different from a raincoat or thermal underwear intended for private use.

The latest revision of the specification has been amended to include disposable face coverings as well as re-useable face coverings. However, it is anticipated that the majority of face coverings produced to this specification will be of the re-useable kind.

BRC is cognizant of work being carried out in CEN (European Standardisation Organisation) to develop a specification that has consensus approval across Europe but that work is currently focused around the application of tests which BRC believe to be inappropriate to face coverings of the type to which this specification applies. BRC is engaged with the UK input to this work in Europe and will seek to present a alternative approach based on this specification. However, BRC recognises that the situation is rapidly changing and that this specification may be overtaken in the future by developments in Europe. In the meantime, BRC firmly believes that this specification represents the most appropriate means of demonstrating compliance with the General Product Safety Regulations whilst also ensuring consistency and quality of the product.

Other documents have included guidance on the likely behaviour of different textile materials but this runs the risk as being seen as both too prescriptive and too restrictive and might be taken to imply that other constructions or materials cannot be used. This specification has been developed to ensure a consistent minimum performance of the finished face covering regardless of the construction or materials used.

2. DESIGN

The specification is not intended to be design restrictive and allows for face coverings to be made from 1 or more layers of fabric. The face coverings must be capable of being applied to the wearer’s face such that they fit with minimal gaps around mouth, nose and chin. The means of attachment to the head has been specified such as to allow different means of adjustment of fitting provided that the wearer’s comfort is assured.

The specification intentionally does not provide any guidance on the shape or size of face coverings nor on the choice of materials used. This is because design and material selection are inter-related and the performance requirements can be met by the careful choice of material(s) which have the appropriate properties.

3. PERFORMANCE REQUIREMENTS

- a. As re-useable face coverings are required to be laundered multiple times (after each use), it is necessary that the face coverings both comply in their original condition (as first supplied new) and also retain their key properties after repeated laundering. As such the requirements include the use of 5 washes as a means to ensure that the performance requirements will continue to be met throughout the lifetime of the product.

The choice of 5 wash cycles is both intentional and consistent with the practice throughout other specifications for textile products which do fall within the remit of the PPE Regulations. The majority of any deterioration and/or shrinkage will occur within the first 5 wash cycles and provided that such deterioration does not compromise the performance of the face covering, it is not expected the higher numbers of washes will cause any further significant deterioration.

It is not anticipated that such articles will be suitable for dry cleaning. However, the solvents used in dry cleaning can be extremely harmful and as the items are in extremely close proximity to mouth and nose so the risk of inhalation of any residual solvent is considered too dangerous. For this reason it is vital that items are clearly marked as ‘Do not dry clean’. EN ISO 3758 sets out that where a specific care label process is considered inappropriate then a negative statement (‘Do not ...’) is required. This is also consistent with the approach taken in certain other countries such as USA.

- b. The performance requirements include both tests that relate directly to the useability and safety of the face covering but also other tests which are relevant to ensuring the fitness for purpose of the item in accordance with the UK’s Consumer Rights Act 2015.
- c. Fibre composition has been included as a reminder that products comprising at least 80% by weight of textile materials must be labelled with a declaration of their fibre composition in accordance with EU Regulation 1007/2011. In addition, the information may be pertinent to consumers who may have specific allergies or reasons why they cannot wear textiles made from specific fibre types.
- d. Face coverings must allow the passage of air so as to avoid any risk of asphyxiation of the wearer. The test shall be performed on finished face coverings so as to ensure that where more than a single layer of material is used so the effect of multiple layers still permits adequate passage of air through the face covering. It is not expected that the face covering will be too thick to be tested using this method of test although this is a possibility and therefore precautions may need to be taken during the air permeability test to minimise any edge leakage of air.

The effect of potential edge leakage can be determined by testing a face covering but with an impermeable metal plate place on the air inlet side of test specimen. The test is conducted on both inside and outside surfaces of the face covering to ensure adequate air ingress and air egress.

- e. Face coverings shall be constructed or have a finish which provides a minimum level of aqueous liquid repellency. This test is different from water penetration tests as it looks at whether or not liquid droplets may be absorbed into the textile material forming the outer layer. The test chosen is intended to ensure protection against liquids of differing surface tensions. It has been known that surface finishes can be lost or their efficiency disrupted after repeated washing and therefore the requirement has to be met before and after 5 wash cycles.
- f. Face coverings shall have a resistance to water penetration using the hydrostatic head test method. The levels specified are consistent with those specified in EN 13795-1 (surgical gowns and drapes) and EN 14683 (medical masks). Water repellency can be affected by repeated laundering and so the requirement has to be met before and after 5 wash cycles.

Two different performance levels have been given. The basic performance level is consistent with the requirements given in EN 13975-1 for ‘less critical areas’ whilst the high performance level is broadly consistent with both EN 13795-1 for critical high performance areas and with other British Standards and UK retail specifications on an interpretation of ‘water resistant’.

- g. The means by which aqueous liquid repellency and water penetration resistance are achieved has not been specified. The use of closely woven fabrics and/or non-woven fabrics may be preferable to using fabrics which have a chemical treatment. However, the use of chemical finishes applied to the textiles is not prohibited or even discouraged but consideration should be given to such chemical finishes being applied only to the outer layer of multi-layer face coverings. Any chemical used must comply with applicable EU Regulations on chemical safety such as avoiding the use of perfluorinated compounds.
- h. Fastener attachment strength is included to ensure that the means of attachment of the fastening devices to the body of the face covering is able to withstand repeated stress. The minimum force specified is consistent with that given in CEN/TR 16792. The use of lower forces is not considered appropriate, especially in relation to disposable face coverings, as failure would render the face covering no longer useable.

- i. Colour fastness tests have been included for quality control purposes and the tests and requirements are broadly consistent with UK retail apparel requirements. These tests are needed to avoid colour transfer from the masks to other items of clothing during wear and/or cross-staining occurring during aftercare. Colour fastness to water has been specified in preference to colour fastness to perspiration as it has been found that colour fastness to water is more sensitive to detecting potential problems associated with contact staining than colour fastness to perspiration.
- j. For colour fastness to washing the test selected is based on a multiple wash cycle at 60 °C. According to BS EN ISO 105-C06, 1 multiple wash cycle is approximately equivalent to 5 domestic laundry cycles at temperatures not exceeding 70°C. This makes it more cost effective to perform a single multi-wash cycle than multiple single-wash cycle alternatives.

It is acknowledged that some fashion fabrics may have difficulty in achieving a satisfactory performance in colour fastness to washing due to the higher temperature used. The use of 60 °C is explained in (k) and any change in the wash temperature used for dimensional stability should also be reflected in a change in the temperature used for colour fastness to washing.
- k. Dimensional stability has been selected based on the use of a 60 °C wash cycle using a normal agitation and tumble drying. The use of a wash temperature of 60 °C has been chosen as current scientific opinion is that laundering at higher temperatures will be more effective at deactivating any virus that may contaminate the face mask. However there is a counter-opinion that higher temperatures have not been proven to be any more efficient than the use of lower temperatures such as 40 °C and that it is the use of detergent that is the key to neutralisation of the COVID-19 virus (Note: This is the scientific basis behind government advice on hand washing or the use of hand sanitiser containing at least 60% alcohol content – the soap or alcohol breaks down the lipid coating of the virus thereby killing the virus). The specified performance requirements are based on typical retail performance requirements for woven and knitted fabrics.
- l. The wire penetration test has been included to provide some means of determining the risk of any wire used as a nose bridge adjuster not penetrating through the fabric from which the face covering is made and causing injury to the wearer. The method is a modification of a test used by some retailers for under-wires in bras and details of the test have been included in the specification as Annex A as there is no British Standard available on which to base the test.

- m. The tests for sharp edges and points apply to any non-textile components to prevent injury to the wearer. Depending on the non-textile components, it may be sufficient to establish the absence of sharp edges and sharp points through visual examination rather than by performance of the specified tests. The need for such checks was highlighted in the guidance document issued by the Office for Product Safety & Standards in May 2020.
- n. The tests for pH and formaldehyde have been explicitly included as they provide protection for the wearer against potential skin irritating chemicals. The level specified for formaldehyde is lower than is given in EU Regulations for textile worn adjacent to the skin (EU REACH Regulation 1907/2006 Annex XVII Entry 72) as the proximity of the face mask to the oral cavity is likely to increase the sensitivity to formaldehyde but is still consistent with the lowest detectable levels given in the method of test. The levels specified for both formaldehyde and pH are consistent both with typical UK Retail specifications and with other restricted substance programs including Oeko-Tex, the EU Eco-Labeling scheme for textiles, GOTS, etc.
- o. The migration of certain elements after extraction using an artificial saliva solution is specified in preference to the use of EN 71-3 or EN 16711-2 (migration after extraction using artificial acid perspiration solution). This is because the inner lining of the face covering will be in very close proximity to the oral cavity and therefore the likelihood of the material coming into contact with saliva is significantly higher than for most apparel or textile products.

The test in EN 16711-3 is not dissimilar to that used for determining nickel release in metal components according to EN 1811. However, as it is not expected that textiles with a coating will be used so there is no need for the ageing process in EN 12472 to be carried out. The results are expressed in $\mu\text{g}/\text{cm}^2/\text{hour}$. The limits set are consistent with those specified in the EU Reach Regulations for lead release and have been extended to include the 3 additional elements for which limits are set in REACH (Annex XVII Entry 72) for skin contact.

4. CHEMICAL REQUIREMENTS

The chemical requirements are intended only to remind manufacturers of the need for the materials used to comply with relevant restricted substance legislation. Depending on the materials used and the finishes applied to them, not all Regulations listed will be applicable but the list is non-exhaustive and it is for the manufacturer to ensure that the materials they use do not contain harmful chemicals.

5. LABELLING REQUIREMENTS

The labelling/marketing requirements have been set out to provide the minimum labelling or marking requirements deemed appropriate to ensure that the relevant information for the same use of the face coverings is communicated to the consumer. Some of the labelling requirements are references to information that is required to be provided under other EU or UK legislation (e.g. fibre composition, manufacturer or importers details, etc).

If a sew-in label is used it is recommended that this is not attached so as to lay on the inside surface of the face covering where it may cause irritation to the wearer.

DIFFERENTIATION FROM PPE MASKS

It should be noted that existing specifications for medical/ surgical masks (which are deemed as medical devices in accordance with the EU Medical Device Regulations) and for filter masks i.e. N95, FFP2, FFP3 (which are deemed as category III personal protective equipment under the PPE Regulations) include other tests for bacteriological and microbiological behaviour and filtration efficiency for sub-micron particles.

These specialist tests have been excluded from this specification. The rationale for exclusion is that fashion barrier face coverings are not intended to provide protection against infectious agents and are intended to be laundered between each use. In addition, the use of air permeability as a method for determining the breathability of the item is deemed adequate rather than the more complex differential pressure test used for PPE.

Such tests as given in EN 149 and in EN 14683 are both costly to perform and only available from a limited number of laboratories on a global basis and amid the current COVID-19 pandemic is leading to significant lead times for testing. As such the inclusion of such tests was deemed inappropriate for this specification on grounds of availability, cost, and timescale.

Other tests such as for tensile strength, bursting strength, seam strength, abrasion, etc have also been excluded as the size of the face coverings would preclude such tests from being carried out on finished products and the likelihood of failure due to such tests is relatively unlikely. It is far more likely that face coverings will reach their end of useable life as a consequence of failure of the fastening and/or aesthetic loss of appearance after repeated laundering or as a consequence of any nose bridge insert penetrating through the outer or inner layers of material.

ANNEX B (NORMATIVE): WIRE PENETRATION TEST

Scope:	To determine the force required for any wire insert used in the nose bridge of the face covering to penetrate through the surrounding textile materials.
Equipment:	<div>a) Tensile tester with a load range of not less than 250N and able to run at a crosshead speed of 20 mm/min.</div> <div>Alternatively a force gauge with a capacity of not less than 90N and/or clamps and masses which can apply a deadweight force of 90N to the sample may be used</div> <div>b) Pliers</div>
Conditioning:	Samples shall be conditioned for a minimum of 4 hours at 20 ± 2 ° and 65 ± 4 % relative humidity
Test specimens:	5 face coverings are to be tested
Test procedure:	<div><div>1. Using scissors, cut through the textile material covering approximately 65% of the length of the nose wire insert so as to expose the nose wire insert. Do NOT remove the unexposed wire from the cavity of the face covering in which it is located.</div><div>2. Using the pliers, bend the nose wire so for a J-shape in which the longer exposed part forms the longer leg of the J-shape and the shorter leg of the J-shape is formed by the textile covered wire (see Figure 1).</div><div>3. Mount the exposed nose wire of the test specimen in one jaw of the tensile tester (or clamp). Fold the fabric that was cut away from the wire so that it hangs vertically below the wire and can be gripped in a second jaw (or clamp). The sample should be clamped without any tension applied to the test specimen (i.e. slack mounted)</div><div>4. If using a tensile tester, set the tensile tester in motion at a crosshead speed of 20 mm/min until either the textile fabric is ruptured by the wire or a force of 90N has been exceeded without rupture. (Note: It is permitted to continue the test until rupture occurs even if this force is greater than 90N if it is desired to know at what force rupture occurs. However, this information is not required for compliance purposes)</div><div>5. If using a hand-held force gauge or deadweight system, apply a force of 90 ± 1 N within 5 seconds and maintain for 10s. Report either the force at which rupture occurs (if less than 90N) or '90+ N' if no rupture occurred</div><div>6. It is possible that some wires may bend and deform before the 90N force is achieved or has been maintained for the required 10s. In such cases, provided that the wire has not penetrated through the textile material of the face covering, record 'Wire deforms without penetration of face covering'. Such test results should be considered as being meeting the requirements of this test as it satisfactorily demonstrates that the wire will not pass through the textile material and thus will not cause facial injury to the user under conditions of normal wear.</div><div>7. Repeat the test on the remaining 4 face coverings</div><div>8. Calculate the mean force to rupture of those samples where the wire has punctured the textile material.</div></div>

Test report:

Report the individual and mean rupture values to the nearest 1N. For samples which deformed without achieving the 90N force required record the results as 'Deforms without rupture'. For samples which did not penetrate the textile material at 90N report '90+ N' or optionally report the force at which rupture occurs.

If applicable, report any other information pertinent to the reason for rupture.

KEY

1. Clamp
2. Exposed Wire
3. Covered Wire
4. Fabric Of Face Covering

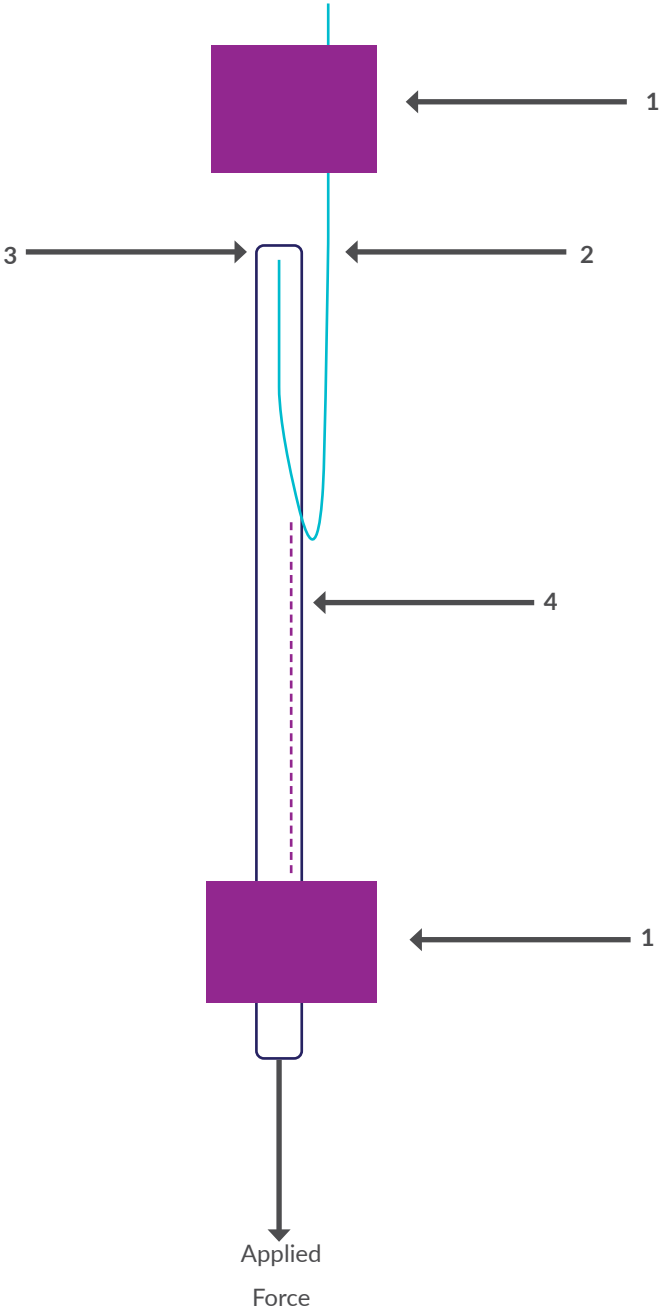


Figure 1: Wire penetration test

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