SONASPECTION

EXPERTS IN MANUFACTURING FLAWED SPECIMENS AND MOCK-UPS

Institution of MECHANICAL ENGINEERS

Improving the world through engineering

Manufactured in the UK & USA

RFS NDT

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INTRODUCTION

Sonaspection is the longest established manufacturer of flawed specimens in the Non-Destructive Testing (NDT) industry, starting in 1980 and have developed many well recognised 'industry standard' flaw manufacture and implanting techniques.

Having led the field in flaw manufacture, Sonaspection are internationally accepted as the standard for NDT training and qualification and have sold their products to all the major performance demonstration, training and qualification centres around the world. Sonaspection's samples are also used in procedural and equipment development in NDT.

High quality flaws are achieved by a combination of Sonaspection's first class workmanship and craft, a unique blend of welding and NDT skills, plus a full understanding of the product.

Sonaspection's flawed specimens contain purposely induced real flaws which are accurately sized and located. Each specimen is supplied with documentation detailing flaw types, sizes and location.

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LOCATIONS

Sonaspection benefit from having manufacturing facilities in both Lancaster, UK and Concord, North Carolina, USA, providing increased capacity and flexibility to meet the needs of our customers around the world.

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EDUCATIONAL KITS

A set of miniature welds, macro sections and photo-radiographs to demonstrate the principles of flaw detection, flaw interpretation and basic sizing.

RECOMMENDED FOR

- Introduction to weld flaws
- Demonstrate principles of flaw detection
- Demonstrate typical flaw responses
- Demonstrate principles of flaw interpretation
- Basic flaw sizing

KIT CONTENTS

- 10 miniature flawed specimens, each implanted with one flaw
- Flaw location details
- Testing and acceptance criteria
- Photo-radiographs (where applicable) for each specimen
- 10 Macro sections
- Magnifying glass
- Certificate of conformance

METHODS

- Demonstration kit covering all methods
- Ultrasonic testing
- Magnetic particle testing
- Penetrant testing
- Visual testing
- Radiographic testing

MATERIALS

- Carbon Steel
- Stainless Steel
- Aluminium

Kits are presented in a durable polypropylene case with high density black molded inserts.

KIT TYPES AND CONTENTS

DEMONSTRATION KIT (KTCS91) - 13 KG/29 lbs
The 1 tee and 9 plate specimens are a variety of pieces carefully selected from each of the other kits in order to provide an overview of flaw types and their detection using various non-destructive testing techniques.

ULTRASONIC KIT (KTCS86) - 12 KG/26 lbs
The 1 tee and 9 plate specimens contain a selection of commonly occurring surface-breaking and weld-body flaws.

VISUAL KIT (KTCS87) - 12 KG/26 lbs
The 3 tee and 7 plate specimens contain a selection of commonly occurring visual welding flaws and irregularities.

MAGNETIC PARTICLE (KTCS88) & PENETRANT KIT (KTCS89) - 12 KG/26 lbs
The 3 tee and 7 plate specimens contain a selection of commonly occurring surface-breaking flaws.

RADIOGRAPHIC KIT (KTCS90) - 12 KG/26 lbs
The 1 tee and 9 plate specimens contain a selection of commonly occurring surface-breaking and weld-body flaws.

WELD FLAW IDENTIFICATION KIT (KTCS92) - 7 KG/15 lbs
Contains 30 macro sections showing flaws in cross section.

Image: Visiual Kit
This kit contains 10 macro sections of various flaws

EACH KIT CONTAINS THE FOLLOWING FLAWS AS INDICATED				MT Kit	PT Kit	VT Kit	Demo Kit	UT Kit	RT Kit	Weld ID Kit
Def 1		Toe Crack		MT	PT		DM	UT		W
Def 1A		Toe Crack		MT	PT					W
Def 1B		Toe Crack		MT	PT					
Def 1C		Toe Crack (Full Pen)						UT		
Def 2		Root Crack		MT	PT		DM	UT	RT	W
Def 3		Side Wall Crack								W
Def 4		Centre Line Crack Surface		MT	PT					W
Def 5		Centre Line Crack Weld Body						UT		W
Def 6		Porosity Weld Body					DM	UT	RT	W
Def 6A		Porosity Surface Breaking		MT	PT	VT				W
Def 7		Slag					DM	UT	RT	W
Def 8		Lack of Side Wall Fusion					DM	UT		W
Def 9		Lack of Root Fusion		MT	PT				RT	W
Def 10		Root Concavity				VT	DM		RT	W
Def 11		Incomplete Root Penetration SV				VT		UT	RT	W
Def 12		Over Penetration				VT			RT	W
Def 13		Incomplete Root Penetration DV						UT		W
Def 14		Lamination		MT	PT					W
Def 14A		Lamination Weld Preparation		MT	PT					W
Def 14B		Lamination						UT		W
Def 15		Irregular Root Penetration				VT	DM		RT	W
Def 16		Weld Spatter				VT			RT	W
Def 17		Undercut				VT				W
Def 18		Excess Cap				VT	DM		RT	W
Def 19		Mismatch Plate					DM			W
Def 20		Misalignment Plate								W
Def 21		Crack Surface Breaking			PT		DM			
Def 21A		Crack Subsurface Cap Removed		MT						W
Def 22		Concave Cap				VT				W
Def 22A		Incomplete Weld Fill								W
Def 23		Uneven Leg Lengths				VT				W
Def 26		Lack of Inter Run Fusion								W
Def 27		Underflush								W

FLAWED SPECIMEN SETS

BASIC WELD FLAW EVALUATION

A set of small lightweight and convenient to handle welds specimens, each containing either one or two flaws with a minimum of 18 flaws per set. The sets are designed for practical training, to provide an introduction to flaw detection, sizing and interpretation.

RECOMMENDED FOR

- Introduction to basic flaw detection
- Introduction to basic flaw sizing
- Introduction to basic flaw interpretation
- Simple weld geometries

SET CONTENTS

- 10 small flawed specimens
- Average 18 real flaws
- Flaw location details
- Testing and acceptance criteria
- Certificate of conformance

METHODS

- Ultrasonic testing (FS-CS-01) - 28 KG/62 lbs
- Magnetic Particle (FS-CS-03) - 15 KG/33 lbs
- Penetrant Testing (FS-CS-04) - 15 KG/33 lbs
- Visual Testing (FS-CS-02) - 15 KG/33 lbs
- Radiographic Testing (FS-CS-05) - 28 KG/62 lbs

MT/PT & VT SET CONTENTS			
Description	Thickness	Width	Length
7 Plates	0.6 (1/4)	10 (4)	20 (8)
3 Tees	0.6 (1/4)	10 (4)	20 (8)

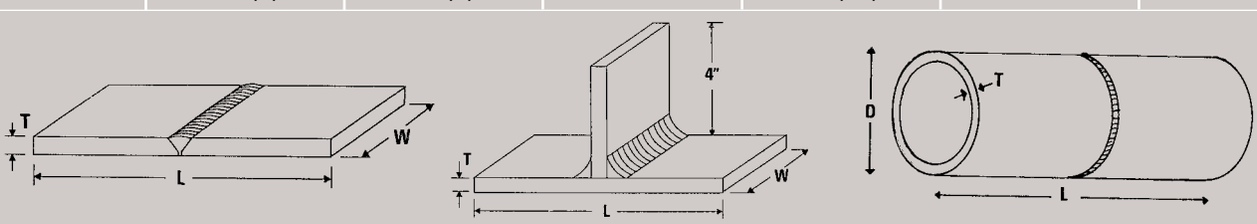
RT SET CONTENTS			
Description	Thickness	Width	Length
4 Plates	1 (3/8)	10 (4)	20 (8)
4 Plates	1.5 (5/8)	10 (4)	20 (8)
2 Pipes	1 (3/8)	10 (4)	20 (8)

UT SET CONTENTS			
Description	Thickness	Width	Length
1 Tee	1 (3/8)	10 (4)	20 (8)
3 Plates	1 (3/8)	10 (4)	20 (8)
4 Plates	1.5 (5/8)	10 (4)	20 (8)
2 Pipes	1 (3/8)	10 (4)	20 (8)

Dimensions above are in cm (inch)

Each set is presented in a durable polypropylene case with high density black molded inserts.

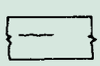
INDIVIDUAL SPECIMENS DIMENSIONS: CM (INCH)						
Specimen	Thickness	Width/Dia	Width/Dia	Length	MT/PT & VT	RT & UT
Pipe (SV)	1 (3/8)	-	10 (4)	20 (8)	No	Yes
Pipe (SV)	1.8 (3/4)	-	15 (6)	20 (8)	No	Yes
Tee (SV)	0.6 (1/4)	10 (4)	N/A	20 (8)	Yes	No
Tee (SV)	1 (3/8)	10 (4)	N/A	20 (8)	No	Yes
Plate	0.6 (1/4)	10 (4)	N/A	20 (8)	Yes	No
Plate	1 (3/8)	10 (4)	NA	20 (8)	No	Yes
Plate	1.5 (5/8)	10 (4)	NA	20 (8)	No	Yes
Plate	2.5 (1)	15 (6)	NA	25 (10)	No	Yes



MATERIALS			
	Carbon Steel	Stainless Steel	Aluminium
Set Type			
Ultrasonic	Yes	Yes	Yes
Visual	Yes	-	-
Magnetic	Yes	-	-
Penetrant	Yes	Yes	Yes
Radiographic	Yes	Yes	Yes

SPECIMEN DETAILS	
Description	Dimensions: cm (inch)
Flaw length range	1 (3/8) to 1.8 (3/4)
Flaw height range	0.3 (1/8) to 0.6 (1/4)
Flaw size tolerance	+ or - 0.3 (1/8)
Specimen size tolerance	+ or - 15%
Specimen thickness tolerance	+ or - 10%
Specimen diameter tolerance	+ or - 10%

FLAW TABLE

PLANAR FLAWS		ROOT CONDITIONS	VOLUMETRIC FLAWS	OTHER WELD CONDITIONS
 Toe crack	 Side wall crack	 Incomplete penetration	 Porosity	 Excess cap
 Transverse crack (Surface breaking)	 Lack of side wall fusion	 Irregular root penetration	 Surface porosity	 Weld spatter
 Transverse crack (Embedded)	 Centre-line crack weld body	 Root concavity	 Slag	 Mismatch
 Root crack	 Lamination	 Incomplete penetration	 Tungsten Inc	 Cold lap
 Centre-line crack surface	 Crater crack	 Lack of root fusion		 Concave cap
		 Burn through		 Undercut
		 Over penetration		 Incomplete weld fill

STANDARD FLAWED SPECIMENS

ADVANCED WELD FLAW EVALUATION

Standard Flawed Specimens are designed and manufactured to meet the requirements of all known internationally recognised Qualification Programme.

- Advanced training and practice prior to qualifications on:
  - Flaw detection
  - Flaw sizing
  - Flaw interpretation
- Realistic size welds
- Common weld geometries

Sonaspection flawed specimens are avaliable either individually or in sets.

INDIVIDUAL SPECIMENS

Contain three different flaw types and are:

- All different sizes
- Uniquely numbered
- Supplied with NDT reports
- Supplied with acceptance/rejection criteria

RECOMMENDED SETS

- Contain a selection of individual specimens as above, with an average of three flaws per specimen
- Contain at least one example of each flaw type listed in the flaw table
- Contain a minimum total weld length of 360cm (144")

CUSTOM SETS

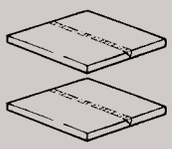
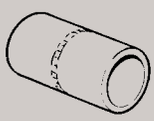
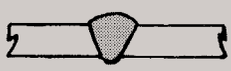
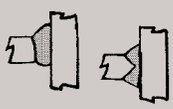
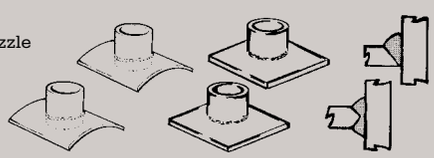
Manufactured specifically for recognised qualification schemes - for example ASNT, ACCP and API

For Level II training, practice and qualification i.e. ACCP, SNT-TC-IA, BS EN ISO 9712, API and others.

STANDARD FLAWED SPECIMEN

ULTRASONIC SPECIMENS

INDIVIDUAL SPECIMENS

Part No.	Specimen Type	Weld Preparation Type	Approx Dimensions:cm (inch) (or nearest commercial size) Diameter	Thickness	Size	Approx Weight kg (lb)
UC-14	Plate		N/A	0.6 (1/4)	30x30 (12x12)	4 (9)
UC-15			N/A	1.2 (1/2)	30x30 (12x12)	8 (18)
UC-16			N/A	2.5 (1)	30x40 (12x16)	23 (51)
UC-17			N/A	2 (3/4)	30x30 (12x12)	14 (31)
UC-18			N/A	2.5 (1)	30x40 (12x16)	23 (51)
UC-19			N/A	3 (1 1/4)	30x44 (12x17 1/4)	31 (68)
UC-20	Pipe		8 (3)	1.2 (1/2)	30 (12) long	7 (15)
UC-21			15 (6)	1.2 (1/2)	30 (12) long	14 (30)
UC-22			15 (6)	2.5 (1)	30 (12) long	28 (62)
UC-23			20 (8)	1.2 (1/2)	30 (12) long	18 (39)
UC-24			20 (8)	2.5 (1)	30 (12) long	37 (82)
UC-25			30 (12)	1.2 (1/2)	30 (12) long	27 (59)
UC-26			30 (12)	2.5 (1)	30 (12) long	56 (122)
UC-27	Tee		N/A	2 (3/4)	15x15x30 (6x6x12)	14 (31)
UC-28			N/A	2.5 (1)	20x20x30 (8x8x12)	23 (51)
UC-29			N/A	2.5 (1)	20x20x30 (8x8x12)	23 (51)
UC-30			N/A	3 (1 1/4)	22x22x30 (9x9x12)	31 (68)
UC-31	Y		N/A	2.5 (1)	20x20x30 (8x8x12)	23 (51)
UC-32			N/A	3 (1 1/4)	22x22x30 (9x9x12)	31 (68)
			Penetration Dia x Thick		Carrier Plate Dimensions L x W x Thickness	
UC-33	Nozzle		10x1.2 (4x 1/2)		50x50x2.5 (20x20x1)	43 (94)
UC-34			20x1.2 (8x 1/2)		50x50x2.5 (20x20x1)	54 (120)
UC-35			10x1.2 (4x 1/2)		50x50x2.5 (20x20x1)	43 (94)
UC-36			20x1.2 (8x 1/2)		50x50x2.5 (20x20x1)	54 (120)
			Stub Dia x Thick		Carrier Plate Dimensions L x W x Thickness	
UC-37	Node		20x2 (8x 3/4)		50x50x2.5 (20x20x1)	75 (165)
UC-38			25x2 (10x 3/4)		50x50x2.5 (20x20x1)	103 (228)

FLAW TABLE


Toe crack

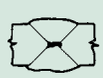

Root crack


Side wall crack


Centre-line crack (embedded)

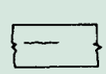

Transverse crack (embedded)


Incomplete penetration (SV)


Incomplete penetration (DV)


Porosity

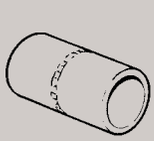
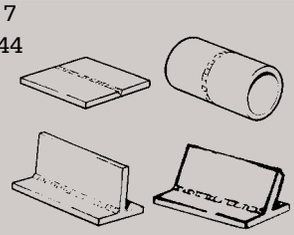

Lack of root fusion


Lamination


Lack of side wall fusion

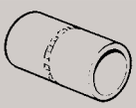
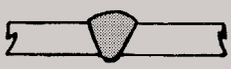
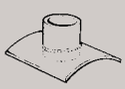
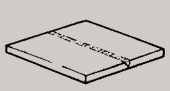
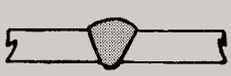
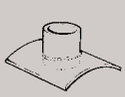

Slag

RECOMMENDED SETS

Specimen Types		Contents	Approx Weight kg (lb)	Specimen Types		Contents	Approx Weight kg (lb)
Set 2 UC-39		3 x UC-15 1 x UC-16 3 x UC-17 2 x UC-18 3 x UC-19	229 (505)	Set 5 UC-42		2 x UC-33 2 x UC-34 2 x UC-35 2 x UC-36	412 (907)
Set 3 UC-40		2 x UC-20 1 x UC-21 1 x UC-22 1 x UC-23 1 x UC-24 1 x UC-25 1 x UC-26	193 (426)	Set 6 UC-43		2 x UC-37 2 x UC-38	357 (786)
Set 4 UC-41		4 x UC-27 2 x UC-28 2 x UC-29 2 x UC-30	211 (464)	Set 7 UC-44		1 x UC-16 1 x UC-19 1 x UC-24 1 x UC-25 1 x UC-26 1 x UC-27 1 x UC-30 1 x UC-31	242 (532)

MAGNETIC AND PENETRANT SPECIMENS

INDIVIDUAL SPECIMENS

Part No.	Specimen Type	Weld Preparation Type	Approx Dimensions:cm (inch) (or nearest commercial size) Diameter	Thickness	Size	Approx Weight kg (lb)
MC-01	Plate 		N/A	1 (3/8)	30x20 (12x12)	5 (10)
MC-02 MC-03 MC-04 MC-05	Pipe 		8 (3) 15 (6) 20 (8) 30 (12)	1 (3/8) 1 (3/8) 1 (3/8) 1 (3/8)	20 (8) long 20 (8) long 20 (8) long 20 (8) long	4 (9) 8 (17) 10 (21) 22 (48)
MC-06	Tee 		N/A	1 (3/8)	15x15x30 (6x6x12)	7 (15)
MC-07	Y 		N/A	1 (3/8)	15x15x30 (6x6x12)	7 (15)
MC-08 MC-09	Nozzle 		Penetration Dia x Thick 10x1 (4x3/8) 20x1 (8x3/8)		Carrier Plate Dimensions L x W x Thickness 40x40x1.2 (16x16x1/2) 40x40x1.2 (16x16x1/2)	 17 (38) 22 (49)
MC-10 MC-11	Node 		Stub Dia x Thick 20x1 (8x3/8) 25x1 (10x3/8)		Carrier Plate Dimensions L x W x Thickness 40x40x1.2 (16x16x1/2) 40x40x1.2 (16x16x1/2)	 32 (70) 37 (81)
PC-01	Plate 		N/A	1 (3/8)	30x20 (12x12)	5 (10)
PC-02 PC-03 PC-04 PC-05	Pipe 		8 (3) 15 (6) 20 (8) 30 (12)	1 (3/8) 1 (3/8) 1 (3/8) 1 (3/8)	20 (8) long 20 (8) long 20 (8) long 20 (8) long	4 (9) 8 (17) 10 (21) 22 (48)
PC-06	Tee 		N/A	1 (3/8)	15x15x30 (6x6x12)	7 (15)
PC-07	Y 		N/A	1 (3/8)	15x15x30 (6x6x12)	7 (15)
PC-08 PC-09	Nozzle 		Penetration Dia x Thick 10x1 (4x3/8) 20x1 (8x3/8)		Carrier Plate Dimensions L x W x Thickness 40x40x1.2 (16x16x1/2) 40x40x1.2 (16x16x1/2)	 17 (38) 22 (49)
PC-10 PC-11	Node 		Stub Dia x Thick 20x1 (8x3/8) 25x1 (10x3/8)		Carrier Plate Dimensions L x W x Thickness 40x40x1.2 (16x16x1/2) 40x40x1.2 (16x16x1/2)	 32 (70) 37 (81)

FLAW TABLE

 Toe crack

 Root crack

 Centre-line crack surface

 Transverse crack (surface breaking)

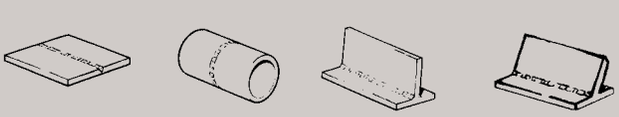
 Surface porosity

 Lack of root fusion

 HAZ crack

 Crater crack

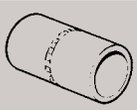
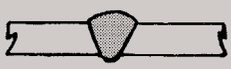
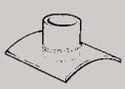
RECOMMENDED SET



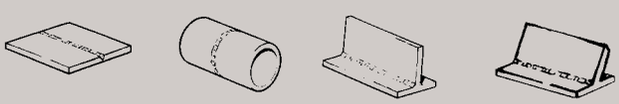
MC-12 Magnetic	PC-12 Penetrant	Approx Weight kg (lb)
1 x MC-01	1 x PC-01	70 (155)
2 x MC-03	2 x PC-03	
2 x MC-05	2 x PC-05	
1 x MC-06	1 x PC-06	
1 x MC-07	1 x PC-07	

VISUAL SPECIMENS

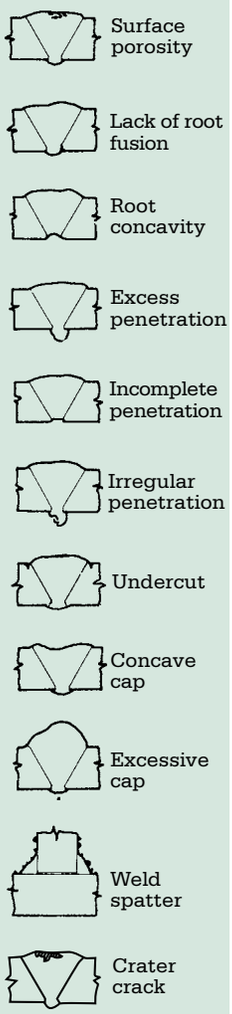
INDIVIDUAL SPECIMENS

Part No.	Specimen Type	Weld Preparation Type	Approx Dimensions:cm (inch) (or nearest commercial size) Diameter	Thickness	Size	Approx Weight kg (lb)
VC-73	Plate 		N/A	1 (3/8)	30x20 (12x12)	5 (10)
VC-74	Pipe 		8 (3)	1 (3/8)	20 (8) long	4 (9)
VC-75			15 (6)	1 (3/8)	20 (8) long	8 (17)
VC-76			20 (8)	1 (3/8)	20 (8) long	10 (21)
VC-77			30 (12)	1 (3/8)	20 (8) long	22 (48)
VC-78	Tee 		N/A	1 (3/8)	15x15x30 (6x6x12)	7 (15)
VC-79	Y 		N/A	1 (3/8)	15x15x30 (6x6x12)	7 (15)
VC-80 VC-81	Nozzle 		Penetration Dia x Thick		Carrier Plate Dimensions L x W x Thickness	
			10x1 (4x3/8)		40x40x1.2 (16x16x1/2)	17 (38)
			20x1 (8x3/8)		40x40x1.2 (16x16x1/2)	22 (49)
VC-82 VC-83	Node 		Stub Dia x Thick		Carrier Plate Dimensions L x W x Thickness	
			20x1 (8x3/8)		40x40x1.2 (16x16x1/2)	32 (70)
			25x1 (10x3/8)		40x40x1.2 (16x16x1/2)	37 (81)

RECOMMENDED SET

Set 9	VC-84	Approx Weight kg (lb)
	2 x VC-73 2 x VC-75 1 x VC-77 1 x VC-78 1 x VC-79	45 (100)

FLAW TABLE



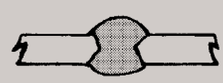
SECURE SPECIMENS

Are similar to individual specimens except that:

- Specimens are supplied in a sealed container
- Flaw types and distribution are to a specified standard
- Reports are sealed and kept separate from the specimens
- Reports are sent under separate cover to nominated person

RADIOGRAPHIC SPECIMENS

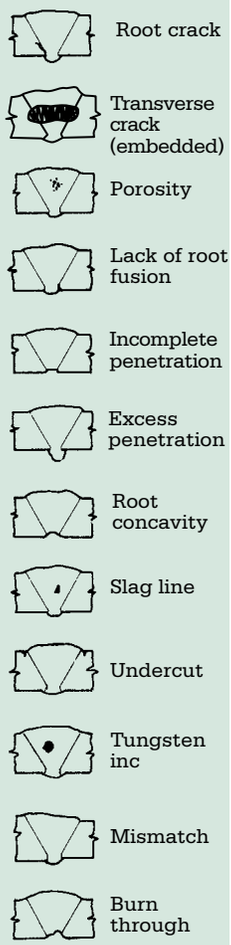
INDIVIDUAL SPECIMENS

Part No.	Specimen Type	Weld Preparation Type	Approx Dimensions:cm (inch) (or nearest commercial size)			Approx Weight kg (lb)
			Diameter	Thickness	Size	
RC-50	Plate		N/A	0.6 (1/4)	30x20 (12x8)	3 (6)
RC-51			N/A	1 (3/8)	30x20 (12x8)	5 (10)
RC-52			N/A	1.5 (5/8)	30x20 (12x8)	7 (15)
RC-53			N/A	2 (3/4)	30x20 (12x8)	9 (21)
RC-54			N/A	2.5 (1)	30x20 (12x8)	13 (26)
RC-55			N/A	3 (1 1/4)	30x20 (12x8)	14 (31)
RC-56	Plate		N/A	0.6 (1/4)	30x20 (12x8)	3 (6)
RC-57			N/A	1 (3/8)	30x20 (12x8)	5 (10)
RC-58			N/A	1.5 (5/8)	30x20 (12x8)	7 (15)
RC-59			N/A	2 (3/4)	30x20 (12x8)	9 (21)
RC-60			N/A	2.5 (1)	30x20 (12x8)	13 (26)
RC-61			N/A	3 (1 1/4)	30x20 (12x8)	14 (31)
RC-62	Pipe		2.5 (1)	0.3 (1/8)	20 (8) long	0.3 (0.7)
RC-63			5 (2)	0.5 (3/16)	20 (8) long	1 (2)
RC-64			8 (3)	0.6 (1/4)	20 (8) long	2 (5)
RC-65			15 (6)	0.6 (1/4)	20 (8) long	4 (10)
RC-66			15 (6)	1.2 (1/2)	20 (8) long	8 (18)
RC-67			20 (8)	1.2 (1/2)	20 (8) long	11 (25)
RC-68			20 (8)	2 (3/4)	20 (8) long	18 (40)
RC-69			30 (12)	1.2 (1/2)	20 (8) long	17 (37)
RC-70			30 (12)	2.5 (1)	20 (8) long	33 (74)

RECOMMENDED SET

Set 8		RC-71 2 x RC-50 1 x RC-55 1 x RC-56 1 x RC-61 3 x RC-62	2 x RC-63 1 x RC-64 1 x RC-70	Approx Weight kg (lb) 78 (172)

FLAW TABLE



STANDARD SPECIFICATIONS

SONASPECTION RESERVES THE RIGHT TO ALTER SPECIFICATIONS SHOWN AT ANY TIME.

TYPES/RANGE

The range of flaws available depends on the type of testing being used. See appropriate Flaw Table for full details

MATERIAL TOLERANCES

Weld length for plates, tees and Ys, all 30cm (12") ±5%.
Weld length for pipes, nozzles and nodes, all as per diameter
Thickness ±10%
Diameters ±10%

FLAW SIZE RANGE

Flaw length from 1cm (3/8") to 4.5cm (1 3/4")
Flaw through wall height 0.3cm (1/8") to 0.6cm (1/4")

SURFACE FINISH

Parent material adjacent to weld will be a suitable finish for testing the weld profile, either 'as-welded' or ground flush

FLAW TOLERANCES

Flaw length ± 0.3cm (1/8")
Flaw height ±0.2cm (5/64")
Distance from datum ±0.3cm (1/8")
Depth from surface ±0.2cm (5/64")

FINAL INSPECTION

All specimens are subject to in-house Visual and Non-Destructive Examination. This work is carried out by experienced and approved technicians

MATERIAL TYPES

All standard-size specimens are manufactured from carbon steel.
For plate, tee and Y specimens material conform to EN 10025
Pipe specimens is to ASTM, ANSI, API or similar
(Nozzles and nodes are a combination of both)
All pipe sizes are measured outside diameter

CORROSION PROTECTION

All specimens are coated with a clear corrosion-resistant material before leaving the factory

INSPECTION

All materials are subject to 100% visual and Non-Destructive Examination to ensure that they are free from flaws which may interfere with product performance.

PACKING

All export orders are suitably packed

CUSTOM SPECIMENS AND MOCK UPS

SPECIALISED TRAINING AND QUALIFICATION

Sonaspection products can be used for specific NDT training, procedure development, personnel training and qualification, specialists training and performance demonstration.

- Advanced training and qualifications (Performance Demonstrations)
  - Flaw detection
  - Flaw sizing
- Complex weld geometries
- Exotic materials
- Equipment, procedures and personnel

Custom specimens are supplied with documentation which clearly identifies the flaw types, sizes and locations (flaw truth)

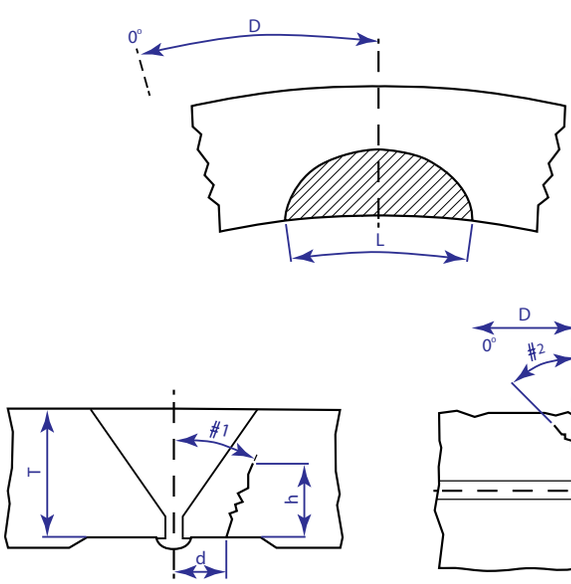
ALL SPECIMENS ARE SUPPLIED WITH AS A MINIMUM:-

- As built CAD drawing
- Flaw size statement optional
- Flaw photographs
- Flaw tracings
- Inspection reports
- Material certificates
- Certificate of conformance

SPECIMEN TYPES

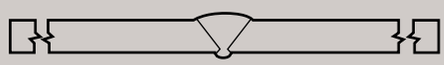
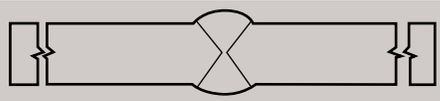
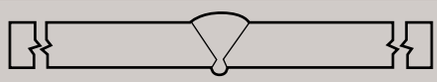
- Ferritic pipes
- Austenitic pipes
- Dissimilar weld metals
- Weld overlay specimens
- Reactor vessel & nozzles
- Core shroud & spray specimens
- Pressuriser mock-ups
- CRDM mock-ups
- Bolting & studs
- Erosion/Corrosion

Ideal for NDT training and PDI qualifications.



TOLERANCES		
DIMENSION	WORKING	FINAL/ REPORTED
Flaw Length (L)	± 4mm (0.16")	± 1.5mm (0.06")
Flaw Height (h)	± 1.5mm (0.06")	± 0.75mm (0.03")
From Weld Centre (d)	± 1mm (0.04")	± 0.5mm (0.02")
From Pipe Datum (D)	± 2mm (0.08")	± 1mm (0.04")
Tilt (#1)	± 5°	± 5°
Skew (#2)	± 5°	± 5°

API TRAINING & PRACTICE

UT SAMPLES	
1/2" Plate connection bevel profile (380mm weld Length)	
1" Plate connection bevel profile (380mm weld Lenght)	
8" NB x Sch. 80 (0.5" wall) wall. Pipe connection bevel profile	
12" NB Sch. 80 (0.688" wall) Half pipe connection bevel profile	

Sonaspection manufactured all the original qualification specimens for API examinations, these specimens are ideal for training and pre-qualification practice.

Our sets are available as either training/practice sets or examination sets. In both cases the specimens are manufactured to API requirements.

Training/practice sets: Are supplied with 'limited' documentation - ultrasonic reports and CAD drawings to show the flaw details.

Examination sets: Comprehensive documentation package including photographs of flaws, material and welding consumable certifications, flaw size statements, radiographs etc. exactly as supplied to API / EPRI for their qualification specimens.

THE SET INCLUDES THESE FOUR SPECIMENS (AS RECOMMENDED BY API):

1 0.5" Thick plate weld with single vee weld (0.5" x 9.0" x 15.0" weld length)
1 1" Thick plate weld with double vee weld (1.0" x 12.0" x 15.0" weld length)
1 8" Diameter Sch. 80 (0.5" wall) x 12" long pipe weld (360°)
1 12" Diameter Sch. 80 (0.688" wall) x 14" long pipe weld (180°)

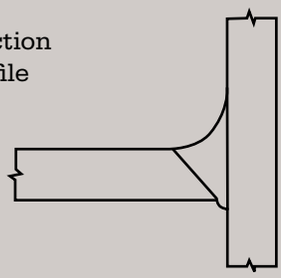
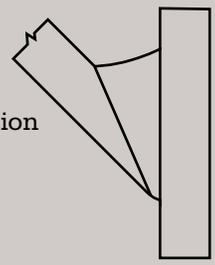
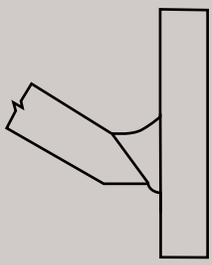
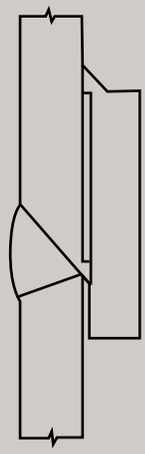
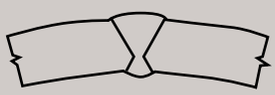
Flaw size tolerance +/- 0.080"

The specimens will contain these type of flaws (as recommended by API)

Porosity	Slag Inclusions	Lack of Fusion
Lack of Penetration	Root & Toe Cracks	Centerline Cracks

PRODUCTS	PART NO
Training / Practice Set	API-T1
Examination Set (secure)	API-E1
Optional 10% ID & OD notches	API-N
Optional radiographs (full set)	API-R
Price on Application	
Individual specimens and custom sets available on request	

API RP 2X

UT SAMPLES	
‘T’ connection bevel profile 	Diagonal connection bevel profile 
Diagonal connection bevel profile 	Simulated pipe splice bevel profile 
16” O.D. pipe longitudinal weld bevel profile 	

Sonaspection produces a recommended practice set typical of those required in API RP 2X for advanced UT training and examination of technician in defect detection, sizing and characterisation for the offshore industry. This set contains 3 welding set-up configurations of your choice, recommended in the code please see above.

Each sample contains 2-4 defects. Sample defects can be designed around level ‘C’ or level ‘A’ criteria although no specific sentencing would be expressed.

TYPICAL DEFECTS:

- Slag inclusion
- Lack of fusion
- Lack of penetration
- Root cracks
- Centre line cracks

DOCUMENT PACKAGE INCLUDES:

- CAD as built drawing
- Manual UT and PT/MT report
- Material Certs
- Weld log and consumable Certs
- QA release note

REFERENCE RADIOGRAPHS FOR TRAINING AND EXAMINATION.

SONASPECTION PRODUCE THIS HANDY A4 PACKAGE FOR RADIOGRAPH INTERPRETATION

It contains 20 Radiographs showing a minimum of 20 defects.
Plus a minimum of 6 processing defects

1. Radiograph report.
2. Radiograph.
3. Student report template.
4. Defect reference section.

ASME XI APPENDIX VII SET

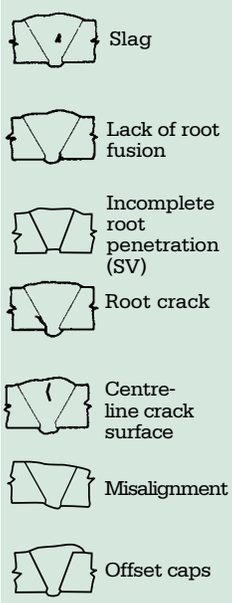
Samples designed for specialist training and performance demonstration. Advanced training and qualification in defect detection, defect sizing, complex weld geometries, exotic materials. Also for training technician on equipment and procedures.

8 samples containing a minimum of 20 defects.

1. 2 plates, 1 Carbon steel weld. 1 stainless steel weld. Size 12.5mm WT x 250mm wide x 300mm weld length.
2. 2 plates, 1 Carbon steel weld. 1 stainless steel weld. Size 25mm WT x 300mm wide x 300 weld length.
3. 1 pipe weld stainless steel. Size 2" sch160 300mm long
4. 1 pipe weld carbon steel. Size 4" sch160 300mm long
5. 1 pipe weld stainless steel. Size 6" sch160 300mm long
6. 1 pipe weld carbon steel. Size 10" sch160 300mm long(180 degree segment)

These custom specimens are supplied with documentation which clearly identifies the flaw types sizes and locations (Flaw truth).

FLAW TABLE



Document package includes

CAD as built drawing
Flaw size statement
Flaw photograph and tracing
Manual UT and PT report
Material Certs
Weld log and consumable Certs
QA release note

Optional extra

Radiographs
10% calibration notches (POA)
Relevant Calibration block
Lockable storage container

ASME XI APPENDIX VIII SET

A Set of samples designed for Specialist training for ASME boiler & pressure vessel code, section XI, appendix VIII Advanced training and qualification in crack detection, crack sizing in complex weld geometries and exotic material. Also for training technician on equipment and procedures.
Sonaspection produce 3 different material sets. In carbon steel, austenitic or dissimilar weld metal joints.

Each set contains 5 pipe samples and 10 ID breaking cracks per set (except for the dissimilar metal welds set contains 15 cracks)

1. 1 pipe weld. Size 2" sch80 600mm long (not included in the dissimilar set)
2. 1 pipe weld. Size 4" sch80 600mm long
3. 1 pipe weld. Size 6" sch160 600mm long
4. 1 pipe weld. Size 8" sch80s 600mm long (only included in the dissimilar set)
5. 1 pipe weld. Size 12" sch80s 600mm long
6. 1 pipe weld .Size 24" sch80s 600mm long (120 degree segment)

These custom specimens are supplied with documentation which clearly identifies the crack sizes and locations. (Flaw truth)

DOCUMENT PACKAGE INCLUDES

CAD as built drawing
Flaw size statement
Flaw photograph and tracing
Manual UT and PT report
Material certs
Weld log and consumable certs
QA release note

Optional extra

Radiographs
10% calibration notches (POA)
Relevant Calibration block
Lockable storage container

SONASPECTION

TRAINING COURSES AVAILABLE FROM USA FACILITY

- Dedicated theory and practical training venue
- Standard UT, TOFD and Phased Array
- Internationally recognised certification including SNT-TC-1A
- ASNT experience hours programme available

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Improving the world through engineering

DISSIMILAR WELDS

Dissimilar metal specimens are one of the most difficult welded specimens to produce. They are also one of the most challenging to examine with ultrasound.

Sonaspection have developed procedures to overcome these challenges and produce high quality specimens with accurate flaws.

We have both the experience and capability and manufacture either individual or a set of specimens, which are customised to your specific requirements.

RECOMMENDED FOR

- Advanced training and qualifications
- Performance Demonstrations
- Flaw detection
- Flaw sizing
- Complex weld geometries
- Exotic materials
- Equipment, procedures and personnel

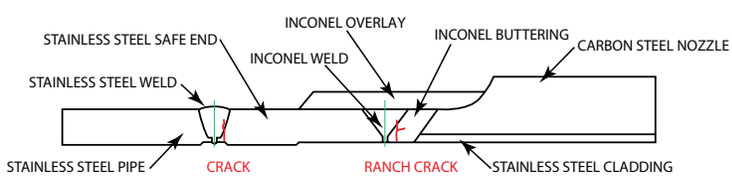
ALL SPECIMENS ARE SUPPLIED WITH

- As built CAD drawing
- Flaw size statement
- Certificate of conformance
- A unique number
- Inspection reports
- Material certificates

Optional extras:

- Flaw photographs
- Flaw tracings

EXAMPLE OF DISSIMILAR WELD SPECIMEN



BEND TEST

Sonaspection has produced a range of bend test samples that can show a student or technician the impact welded defects can have on the structural integrity of a welded joint. We supply them in batches of 5 bars (12mm x 10mm x 200mm long) Each bar has 1 defect in it.

Bar 1 LoSWF
Bar 2 Slag
Bar 3 Clear
Bar 4 LoRF
Bar 5 Toe Crack

Each bar is bend unlit the weld starts to fail and the defect is exposed.

LACK OF FUSION FLAWS		CRACKS	
Item	Thickness	Item	Thickness
SV Plate	12mm	SV Plate	12mm
SV Plate	15mm	SV Plate	15mm
SV Plate	20mm	SV Plate	20mm

BOILER TUBES

Sonaspection have been involved in trials for UT PA in lieu of radiography, we have designed a range of boiler tube sample to help in the training and examination of technician and equipment.

Sonaspections standard boiler tube pack contains 10 Carbon steel pipes, 50mm OD diameter x 5mm WT with range of defects listed in the BS code for boiler tube inspection. Defects include Toe crack, Root crack, HAZ crack, Centre line crack, incomplete penetration, lack of root fusion, lack of side wall fusion, lack of inter run, tungsten, porosity, gas pores, inclusions, wormhole, undercut, excessive penetration, misalignment.

These packs can also be customised, to smaller or larger packs of boiler tubes. Materials can be low alloy or high alloy. Material size, tube diameter and wall thickness or the type of defects you require.

THE STANDARD PACKAGE INCLUDES:

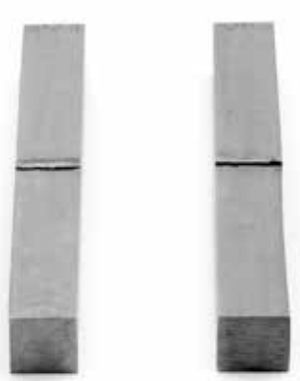
- CAD as built drawing
- Manual UT and PT report
- Material Certs
- Weld log and consumable Certs
- QA release note

Optional extras:

- PA report
- Radiography

CRACK SIZING BARS

Sonaspection produce a range of sizing bars they are a useful tool for crack sizing and characterisation Standard sizes are weld length 30mm x width 300mm in a range of wall thicknesses, 12mm, 20mm, 25mm and 30mm.



They can be made in carbon steel or stainless steel material.

The mechanically induced cracks run the full 30mm weld length, are mechanical induced cracks and come in percentage through wall height. The recommended set would contain 4 blocks.
See table

BLOCK	WT	TWH			
1	12mm	10%	25%	50%	75%
2	20mm	10%	25%	50%	75%
3	25mm	10%	25%	50%	75%
4	30mm	10%	25%	50%	75%

Sonaspection can customise these block to clients request.

CASTING AND FORGING FLAWS

Sonaspection have developed a series of small and lightweight specimens which contain typical flaws found in cast and forged components.

The specimens are designed for practical training to provide experience in flaw detection, sizing and interpretation. Customised specimens are available on request.

THE SPECIMENS PROVIDE

- Basic flaw detection and sizing
- Representative geometries
- An awareness of reporting difficulties

SPECIMENS TO CHOOSE FROM

- Flange Blank, Ingot & Ingot Blank
- Stud
- Wasted Bolt
- Tee Blank
- 4 Spigot Blanks
- Recessed Flange
- Tapered Ingot Blank

Sonaspection casting and forgings are available either individually or in sets.

INDIVIDUAL SPECIMENS

- Contain up to 3 flaws
- Are unique - no two specimens are the same
- Are individually numbered and supplied with:
  - Drawing/NDT report
  - Testing and acceptance criteria
  - Certificate of conformance

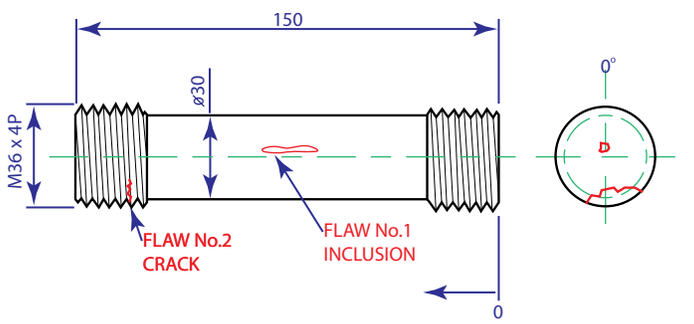
RECOMMENDED SET CONTAINS

- 12 individual specimens
- An average of 20 flaws
- Total weight of 59Kg (130 lbs)

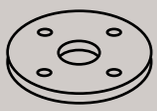
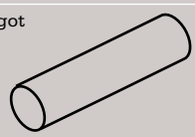
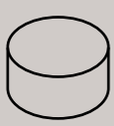
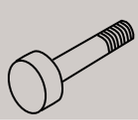
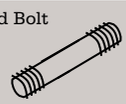
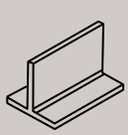
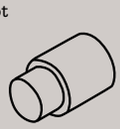
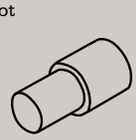
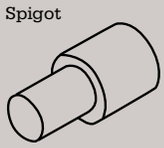
METHODS

- Ultrasonic testing
- Magnetic particle testing
- Penetrant testing

EXAMPLE FOR WASTED BOLT

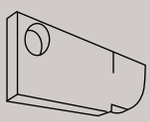
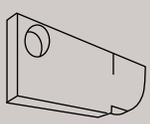
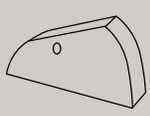
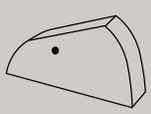
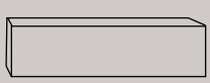
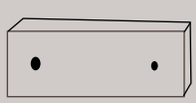


FLAWED FORGING SPECIMENS

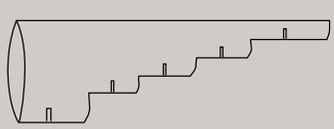
UT/MT/PT INDIVIDUAL SPECIMENS			
Part No.	Specimen Type	Dimensions	Weight
001	Flange 	250mm diameter x 20mm thick	7 KG/15.5 lbs
002	Ingot 	50mm diameter x 200mm long	3.1 KG/6.8 lbs
003	Ingot 	100mm diameter x 50mm thick	3 KG /6.6 lbs
004	Stud 	20mm diameter x 120mm long Head – 50mm diameter x Thread Length – 30mm	0.6 KG/1.3 lbs
005	Wasted Bolt 	36mm diameter x 150mm long Thread length – 25mm	0.85 KG/1.9 lbs
006	Tee 	100mm x 150mm x 10mm	2.2 KG/4.9 lbs
007	Spigot 	100mm diameter x 75mm diameter 150mm long	7.1 KG/15.6 lbs
008	Spigot 	150mm diameter x 50 diameter 55mm long	4.5 KG/10 lbs
009	Spigot 	50mm diameter x 40mm diameter 100mm long	1.2 KG/2.6 lbs
010	Spigot 	75mm diameter x 50mm diameter 150mm long	3.75 KG/8.3 lbs
011	Recessed Flange 	200mm diameter x 40mm thick Recess – 100mm diameter x 10mm deep	9.15 KG/20 lbs
012	Tapered Ingot 	200mm diameter x 175mm diameter x 75mm thick	16.55 KG/36.5 lbs

STANDARD UT CALIBRATION BLOCKS

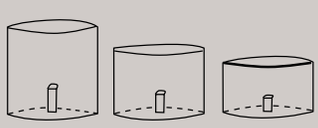
CALIBRATION BLOCKS

Order Code	Shape (not to scale)	Ref Type	Description/Application	Standard Made to	Material /Size
SI-CB-01		No1. EUROPEAN STANDARD	No.1 Calibration Standard Calibration of shear and compression wave probes. Checking beam angle, emergent point and resolution. Calibration of time base and gain settings. 3mm target hole.	EN ISO 2400 2012 Tolerance +/- 0.1mm	STEEL 25mm x 100mm x 300mm 5.2kg (Optional 50mm thickness) 10.4kg
SI-CB-02		V1 - A2	V1 Calibration Standard Calibration of shear and compression wave probes. Checking beam angle, emergent point and resolution. Calibration of time base and gain settings. 1.5mm target hole.	EN12223 2000 BS2704 Tolerance +/- 0.1mm	STEEL 25mm x 100mm x 300mm 5.6kg (Optional 50mm thickness) 10.8kg
SI-CB-03		No2. ISO & EUROPEAN STANDARD	No.2 Calibration Standard Small calibration block for site checking of shear wave probes, time bases and gain settings. 5mm target hole.	EN ISO 7963 2010 Tolerance +/- 0.1mm	STEEL 12.5mm x 43mm x 75mm 0.22kg (Optional 20mm thickness) 0.35kg
SI-CB-04		V2 - A4	V2 Calibration Standard Small calibration block for site checking of shear wave probes, time bases and gain settings. 1.5mm target hole.	BS2704 Tolerance +/- 0.1mm	STEEL 12.5mm x 43mm x 75mm 0.22kg (Optional 20mm thickness) 0.35kg
SI-CB-05		BCB/BCB-N - A5	Beam Calibration Block Beam profile and resolution checks for shear wave probes. Sensitivity checks for shear and compression probes. 9 off 1.5mm diameter holes BCB-N contains four additional 1.5mm diameter holes	BS2704 Tolerance +/- 0.1mm	STEEL 50mm x 75mm x 305mm 9kg
SI-CB-06		A6	Evaluating dominant frequency, pulse lenght, dead zone and resolution power for shear and compression probes	BS2704 Tolerance +/- 0.1mm	STEEL 25mm x 50mm x 150mm 1.5kg

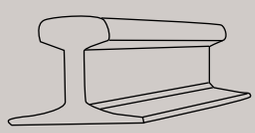
SPECIAL CALIBRATION BLOCKS



Stepped Bar Samples



ASTM Area Amplitude

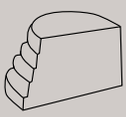
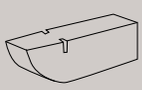
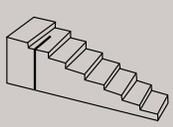
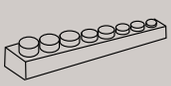
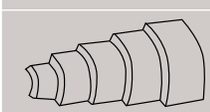
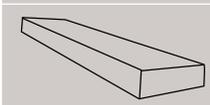
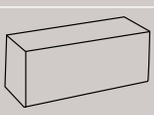


Rail Testing Blocks

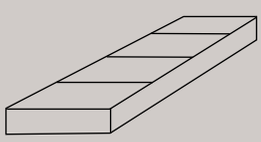
FULL MACHINING OF BLOCKS TO CUSTOMER REQUIREMENTS - FROM 2gm TO 45KG

- Calibration Block material is ultrasonically tested before use.
- Rough machined samples are heat treated and checked for acoustic characteristics
- Special purpose blocks manufactured to order.
- Price on application

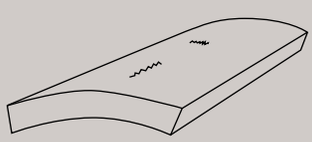
CALIBRATION BLOCKS

Order Code	Shape (not to scale)	Ref Type	Description/Application	Standard Made to	Material /Size
SI-CB-07		RTB A7	Checking shear wave probe resolution, Steps 1, 2, 3, 4 and 5mm	BS2704 Tolerance +/- 0.1mm	STEEL 74mm radius 74mm thick 4kg
SI-CB-08		MU - SPECIAL	Metric Universal Block For general purpose checking as No. 1 block	Tolerance +/- 0.1mm	STEEL 20mm x 50mm x 155mm 1.5kg
SI-CB-09		TBR 2 125 SPECIAL	Radiused Test Block For calibration of bioler probes. Available with 3 or 5 x 1.5mm diameter holes	Tolerance +/- 0.1mm	STEEL 25mm x 20mm x 165mm 0.6kg
SI-CB-10		LSW SPECIAL	Ladder Step Wedge For time based calibration with thickness measuring compression probes. 8 steps from 1mm to 8mm. Plus thickness step of 15mm and notch at 20mm depth	Tolerance +/- 0.1mm	STEEL 8mm x 15mm x 120mm 0.07kg
SI-CB-11		LSW/M SPECIAL	Generally as LSW with 25mm diameter steel inserts mounted in plastic. 8 steps from 1mm to 8mm. Also available in other step sizes	Tolerance +/- 0.1mm	STEEL INSERT Plastic Body 10mm x 20mm x 140mm 0.27kg
SI-CB-12		CSW SPECIAL	Curved Step Wedge For time based calibration of thickness measuring probes. 5 steps - 2, 4, 6, 8 and 10mm	Tolerance +/- 0.1mm	STEEL 100mm Long x 300mm I.D Quadrant 0.14kg
SI-CB-13		ASME (Specify Thickness)	Setting sensitivity levels for weld testing. Sizes and locations of flaws are dependent on weld thickness. Metric or Imperial	ASME Section V Tolerance +/- 0.1mm	STEEL size dependent on weld thickness
SI-CB-14		DAC (Specify thickness) SPECIAL	Setting DC characteristics for shear wave and compression wave probes. Flaws typically 3mm diameter holes at 20%, 40%, 60% and 80% of thickness	(BS3923 1986) Tolerance +/- 0.1mm	STEEL size dependent on weld thickness

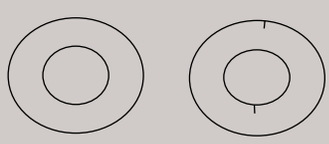
EDDY CURRENT CALIBRATION BLOCKS



Standard Test Block
0.2mm, 0.5mm, 1.0mm Deep



Profiled notches in curved samples



Notches in Tubes and Bars
Longitudinal and transverse

PRECISION SPARK EROSION AND MACHINING OF NOTCHES AND HOLES

- All blocks supplied with fully traceable certification and optional cases.
- Most standard blocks are ex stock.
- Quality assurance
- Price on application

PDI REFERENCE BLOCKS

Reference blocks for advanced calibration of inspection equipment prior to Performance Demonstrations and inspection of pipe welds in the power generating industry.

Sonaspection's in-depth knowledge of Non-Destructive Testing and Performance Demonstration provides a unique insight into the requirements of these specialty reference blocks.

SONASPECTION OFFER A RANGE OF BLOCKS INCLUDING

- 2" Circumferential
- 2" Contour
- 4" Circumferential
- 4" Contour
- 6" Axial
- 6" Contour
- 8" Axial
- 8" Circumferential
- 12" Pipe segment
- 12"-24" Contour
- 24" Pipe segment

THE BLOCKS ARE

- Machined to exacting standards
- Manufactured from ultrasonically clean steel
- Supplied with a CAD drawing
- Custom made to your exact requirements
- Uniquely numbered

Customised blocks are available on request.

Sonaspection also offer PDI Alternative ASME calibration blocks.

CUSTOM REFERENCE BLOCKS

Sonaspection have extensive experience in manufacturing custom blocks to meet your exact requirements.

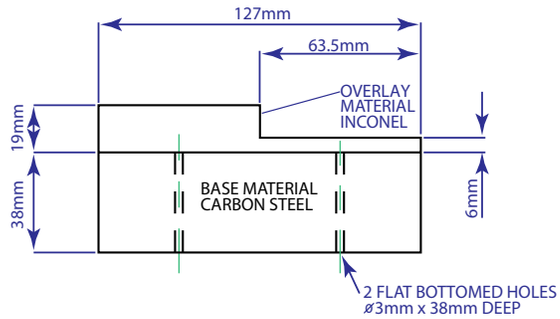
Our capabilities include NDE, Mechanical Inspection, CAD, Specialist Welding, Cladding Overlay, Machining, Bending/Rolling and Heat Treatment

WE MANUFACTURE THE FOLLOWING REFLECTOR TYPES

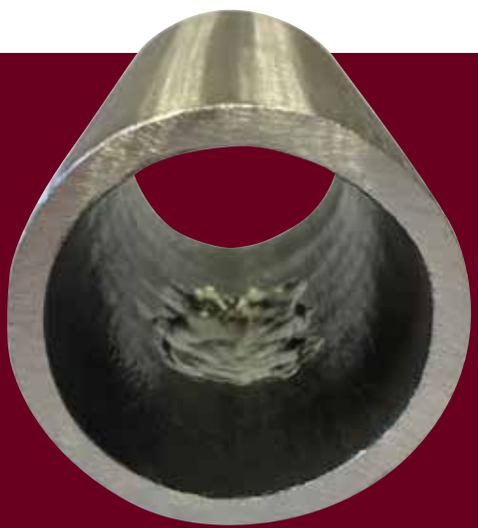
- Slots
- Notches
- Side Drilled Holes
- Flat Bottom Holes

For a quotation please supply specification, detailed drawings, code requirements and material type/grade.

EXAMPLE FOR CUSTOM CLAD BLOCK



CORROSION AND EROSION



The inspection and management of corrosion and erosion is one of the major lasting issues facing pre and in-service inspection.

New testing methods such as Corrosion Under Insulation (CUI) and UT Corrosion Mapping alongside developments in equipment are providing the necessary knowledge and tools to address the estimated $2.2 trillion annual cost.

Sonaspection are able to support the development of expertise in corrosion and erosion with real flaws in the following specifications in pipe and plate specimens:

- Erosion
- Corrosion
- Pitting