SONASPECTION: EXPERTS IN MANUFACTURING FLAWED SPECIMENS AND MOCK-UPS

Institution of MECHANICAL ENGINEERS

Improving the world through engineering

THE INSTITUTION OF MECHANICAL ENGINEERS

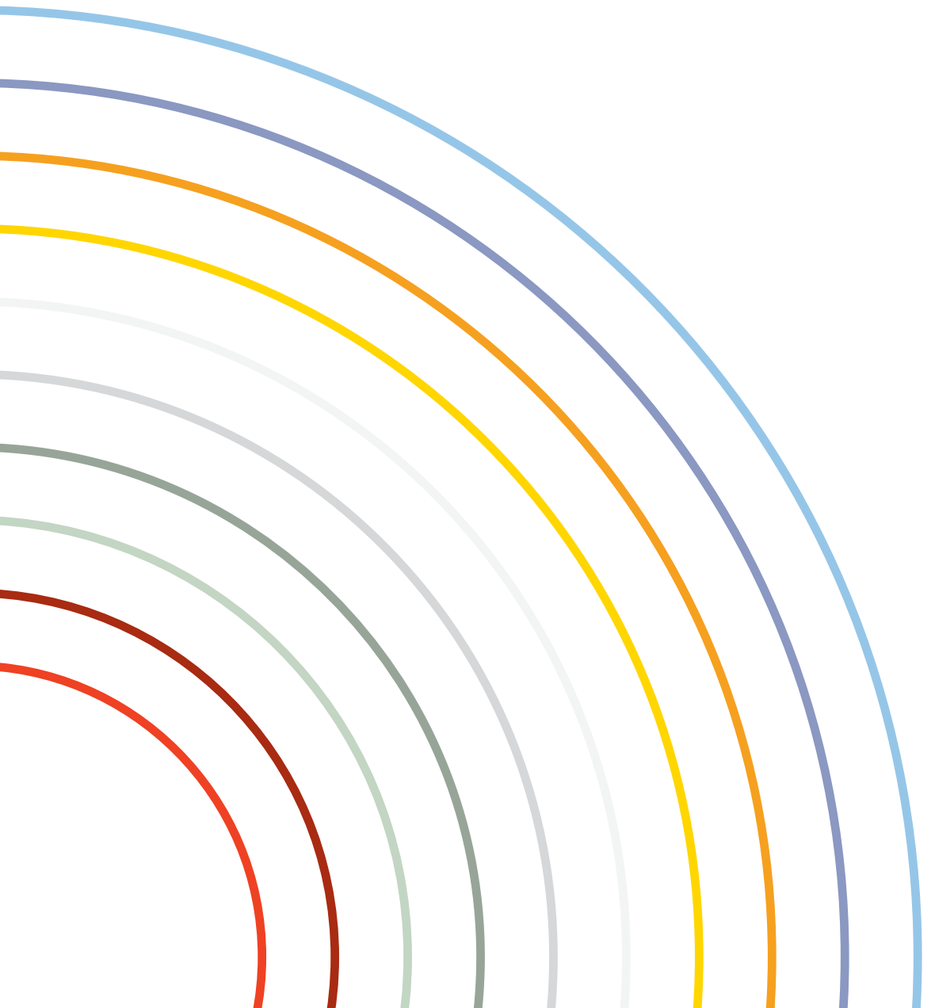
The Institution of Mechanical Engineers is one of the fastest growing professional engineering institutions in the world.

Headquartered in London, we have operations around the world and over 100,000 members in more than 140 countries working at the heart of the most important and dynamic industries.

Established in 1847, the Institution's heritage is today combined with our modern approach to international business.

Wherever you are in the world, the Institution can support you in your work and in your personal development.

As part of our mission to develop professional engineers and expand our non-destructive testing proposition, the Institution acquired Sonaspection in 2013.



INTRODUCTION

Sonaspection is the longest established manufacturer of flawed specimens in the non-destructive testing and evaluation industry, pioneering many well recognised 'industry standard' flaw manufacture and implanting techniques.

High quality flaws are achieved by a combination of first class workmanship, a unique blend of welding and non-destructive testing skills, plus a full understanding of the product.

By adopting a policy of setting new standards and developing new techniques, Sonaspection improves quality and reliability, assuring the high quality of flaws.

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.

Sonaspection flawed specimens can be found in any reputable business providing training and certification of technicians as well as procedure and equipment development in non-destructive testing and evaluation.

Through it's manufacturing facilities in both the UK and USA, Sonaspection supplies flawed specimens, mock-ups and custom calibration standards to companies and institutions all over the world.

SONASPECTION MANUFACTURES:

Standard specimens for use in training and development

Custom specimens manufactured to the client's specific requirements

Secure specimens for examinations and certification

OUR PRODUCTS

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
- 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 moulded inserts.

KIT TYPES AND CONTENTS

DEMONSTRATION KIT (KTCS91)
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)
The 1 tee and 9 plate specimens contain a selection of commonly occurring surface-breaking and weld-body flaws.

VISUAL KIT (KTCS87)
The 3 tee and 7 plate specimens contain a selection of commonly occurring visual welding flaws and irregularities.

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

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

EACH KIT CONTAINS THESE FLAWS				MT Kit	PT Kit	VT Kit	Demo Kit	UT Kit	RT Kit
Def 1		Toe Crack		MT	PT		DM	UT	
Def1A		Toe Crack		MT	PT				
Defg 1B		Toe Crack		MT	PT				
Def 1C		Toe Crack (Full Pen)						UT	
Def 2		Root Crack		MT	PT		DM	UT	RT
Def 3		Side Wall Crack							
Def 4		Centre Line Crack Surface		MT	PT				
Def 5		Centre Line Crack Weld Body						UT	
Def 6		Porosity Weld Body					DM	UT	RT
Def 6A		Porosity Surface Breaking		MT	PT	VT			
Def 7		Slag					DM	UT	RT
Def 8		Lack of Side Wall Fusion					DM	UT	
Def 9		Lack of Root Fusion		MT	PT				RT
Def 10		Root Concavity				VT	DM		RT
Def 11		Incomplete Root Penetration SV				VT		UT	RT
Def 12		Over Penetration				VT			RT
Def 13		Incomplete Root Penetration DV						UT	
Def 14		Lamination		MT	PT				
Def 14A		Lamination Weld Preparation		MT	PT				
Def 14B		Lamination						UT	
Def 15		Irregular Root Penetration				VT	DM		RT
Def 16		Weld Spatter				VT			RT
Def 17		Undercut				VT			
Def 18		Excess Cap				VT	DM		RT
Def 21		Crack Subsurface Weld Cap Removed		MT	PT		DM		
Def 22		Concave Cap				VT			
Def 23		Uneven Leg Lengths				VT	DM		

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

A sturdy storage box is available to purchase for each set: POA.

METHODS

- Ultrasonic testing
- Magnetic particle testing
- Penetrant testing
- Visual testing
- Radiographic testing

MATERIALS

- Carbon Steel
- Stainless Steel
- Aluminium

UT & RT SET CONTENTS

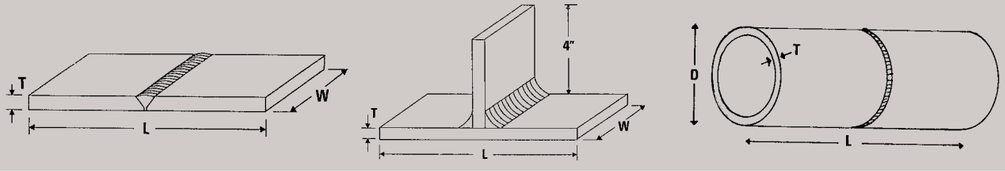
Description	Thickness	Width	Length
1 Tee	1 (3/8)	10 (4)	20 (8)
3 Plates	1 (3/8)	10 (4)	20 (8)
4 Plates	1.5 (5/8)	10 (4)	20 (8)
2 Pipes	1 (3/8)	10 (4)	20 (8)

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)

INDIVIDUAL SPECIMENS DIMENSIONS: CM (INCH)

Specimen	Thk's (T)	Width (W)	Dia (D)	Length (L)	MT/P & VT	UT & RT
Pipe	1 (3/8)	-	10 (4)	20 (8)	Yes	Yes
Pipe	1.8 (3/4)	-	15 (6)	20 (8)	No	Yes
Tee	0.6 (1/4)	10 (4)	N/A	20 (8)	Yes	No
Tee	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



FLAW TABLE

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

MATERIALS

Set Type	Carbon Steel Grade A36*	Stainless Steel Grade 304*	Aluminium Grade 7075*
Ultrasonic	Yes	Yes	Yes
Visual	Yes	-	-
Magnetic	Yes	-	-
Penetrant	Yes	Yes	Yes
Radiographic	Yes	Yes	Yes

*Or similar/equivalent

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%

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, ASNT-TC-IA, PCN, 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)	54 (120)
UC-34			20x1.2 (4x 1/2)		50x50x2.5 (20x20x1)	54 (120)
UC-35			10x1.2 (4x 1/2)		50x50x2.5 (20x20x1)	43 (94)
UC-36			20x1.2 (4x 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

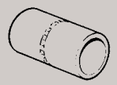
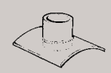
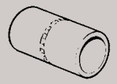
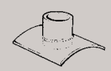
- Toe crack
- Root crack
- Side wall crack
- Centre-line crack
- Transverse crack
- Incomplete penetration (SV)
- Incomplete penetration (DV)
- Porosity
- Lack of root fusion
- Lamination
- Lack of side wall fusion
- Slag

RECOMMENDED SETS

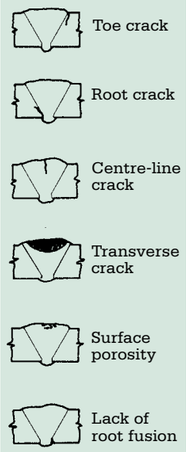
Specimen Types	Contents	Approx Weight kg (lb)	Specimen Types	Contents	Approx Weight kg (lb)
Set 2 UC-39	3 x UC-15 1 x UC-16 3 x UC-17 2 x UC-18 3 x UC-19	229 (505)	Set 5 UC-42	2 x UC-33 2 x UC-34 2 x UC-35 2 x UC-36	229 (505)
Set 3 UC-40	2 x UC-20 1 x UC-21 1 x UC-22 1 x UC-23 1 x UC-24 1 x UC-25 1 x UC-26	193 (426)	Set 6 UC-43	2 x UC-37 2 x UC-38	193 (426)
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	211 (464)

MAGNETIC AND PENETRANT SPECIMENS

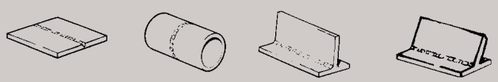
INDIVIDUAL SPECIMENS

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)	30x30 (12x12)	5 (10)
MC-02	Pipe		8 (3)	1 (3/8)	20 (8) long	4 (9)
MC-03			15 (6)	1 (3/8)	20 (8) long	8 (17)
MC-04			20 (8)	1 (3/8)	20 (8) long	10 (21)
MC-05			30 (12)	1 (3/8)	20 (8) long	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	Nozzle		Penetration Dia x Thick		Carrier Plate Dimensions L x W x Thickness	
MC-09			10x1 (4x3/8)		40x40x1.2 (16x16x1/2)	17 (38)
			20x1 (8x3/8)		40x40x1.2 (16x16x1/2)	22 (49)
MC-10	Node		Stub Dia x Thick		Carrier Plate Dimensions L x W x Thickness	
MC-11			20x1 (8x3/8)		40x40x1.2 (16x16x1/2)	32 (70)
			25x1 (10x3/8)		40x40x1.2 (16x16x1/2)	37 (81)
PC-01	Plate		N/A	1 (3/8)	30x30 (12x12)	5 (10)
PC-02	Pipe		8 (3)	1 (3/8)	20 (8) long	4 (9)
PC-03			15 (6)	1 (3/8)	20 (8) long	8 (17)
PC-04			20 (8)	1 (3/8)	20 (8) long	10 (21)
PC-05			30 (12)	1 (3/8)	20 (8) long	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	Nozzle		Penetration Dia x Thick		Carrier Plate Dimensions L x W x Thickness	
PC-09			10x1 (4x3/8)		40x40x1.2 (16x16x1/2)	17 (38)
			20x1 (8x3/8)		40x40x1.2 (16x16x1/2)	22 (49)
PC-10	Node		Stub Dia x Thick		Carrier Plate Dimensions L x W x Thickness	
PC-11			20x1 (8x3/8)		40x40x1.2 (16x16x1/2)	32 (70)
			25x1 (10x3/8)		40x40x1.2 (16x16x1/2)	37 (81)

FLAW TABLE



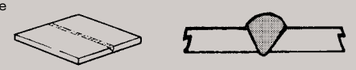
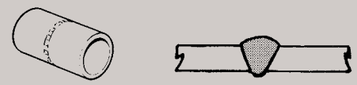
RECOMMENDED SET



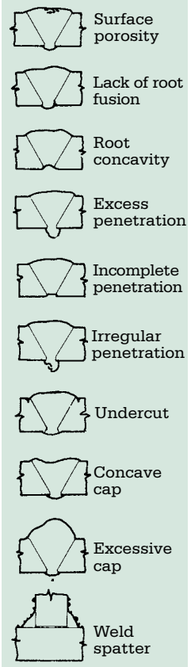
MC-12 Magnetic	PC-12 Penetrant	Approx Weight kg (lb)
1 x MC-01	1 x PC-01	70 (155)
2 x MC-03	2 x PC-03	
2 x MC-05	2 x PC-05	
1 x MC-06	1 x PC-06	
1 x MC-07	1 x PC-07	

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)	30x30 (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	Nozzle		Penetration Dia x Thick		Carrier Plate Dimensions L x W x Thickness	
VC-81			10x1 (4x3/8)		40x40x1.2 (16x16x1/2)	17 (38)
			20x1 (8x3/8)		40x40x1.2 (16x16x1/2)	22 (49)
VC-82	Node		Stub Dia x Thick		Carrier Plate Dimensions L x W x Thickness	
VC-83			20x1 (8x3/8)		40x40x1.2 (16x16x1/2)	32 (70)
			25x1 (10x3/8)		40x40x1.2 (16x16x1/2)	37 (81)

FLAW TABLE



RECOMMENDED SET

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

CUSTOM SETS

Are manufactured to the customer's requirements and are ideal for companies who do not need a full set but need at least one example of each flaw type.

- Contain a minimum of four specimens
- Contain an example of each flaw from the flaw table
- May be used for one or more NDT method

SECURE SPECIMENS

Are similar to individual specimens except that:

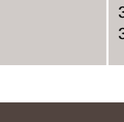
- Specimens are supplied in a sealed container
- Flaw types and distribution are to a specified standard
- Reports are sealed and kept separate from the specimens
- Reports are sent under separate cover to nominated person

RADIOGRAPHIC SPECIMENS

INDIVIDUAL SPECIMENS

Part No.	Specimen Type	Weld Preparation Type	Approx Dimensions:cm (inch) (or nearest commercial size) Diameter	Thickness	Size	Approx Weight kg (lb)
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

 Root crack

 Transverse crack

 Porosity

 Lack of root fusion

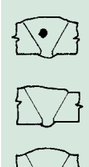
 Incomplete penetration

 Excess penetration

 Root concavity

 Slag line

 Undercut

 Tungsten inc

 Mismatch

 Burn through

STANDARD SIZE SPECIMENS

STANDARD SPECIMEN SPECIFICATIONS

TYPES/RANGE

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

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 (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

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 is to BS 4360 Grade 43A or equivalent and for 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

SPECIALISED TRAINING AND QUALIFICATION

For specific NDT training, procedure development, personnel training and qualification, specialists training and performance demonstration, for example ASME XI Appendix VII training and ASME XI Appendix VIII.

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)

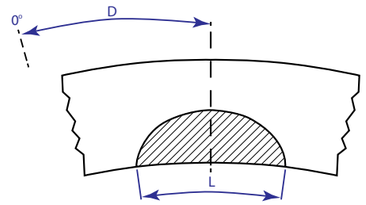
ALL SPECIMENS ARE SUPPLIED WITH AS A MINIMUM:-

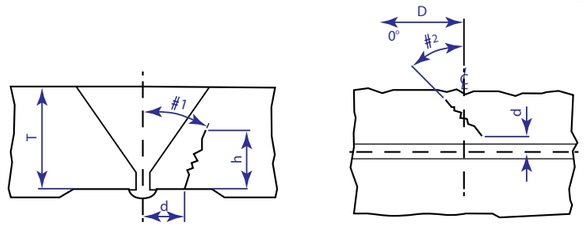
- As built CAD drawing
- Flaw size statement optional
- Flaw photographs
- Flaw tracings
- Inspection reports
- Material certificates
- Certificate of conformance

SPECIMEN TYPES

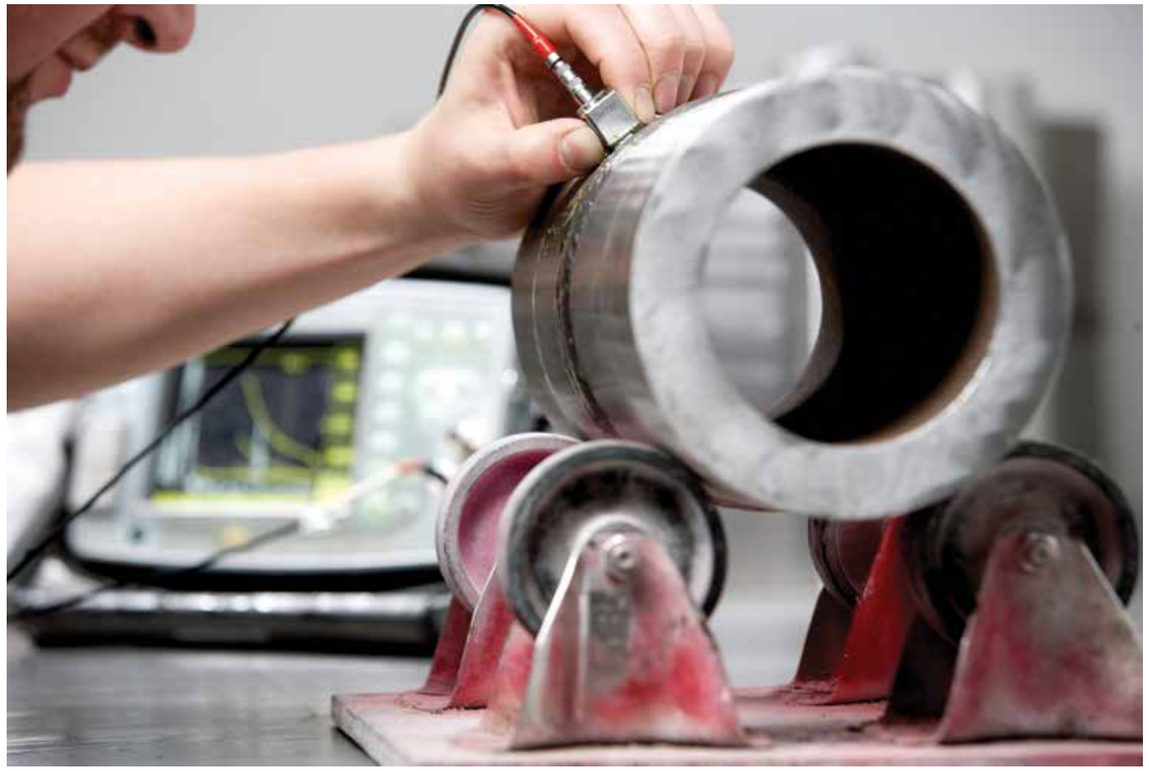
- Ferritic pipes
- Austientic pipes
- Dissimilar weld metals
- Weld overlay specimens
- Reactor vessel & nozzles
- Core shroud & spray specimens
- Pressuriser mock-ups
- CRDM mock-ups
- Bolting & studs
- Erosion/Corrosion

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

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

THE SET INCLUDES

4 weld specimens as recommended by API

- 1/2" thick SV plate 15" long
- 1" thick DV plate 15" long
- 8" Dia Sch 80 pipe 8" long (360˚)
- 12" Dia Sch 80 pipe 10" long (180˚)

TYPICAL FLAWS

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

Radiographs and calibration notches on request: POA

DISSIMILAR WELDS

Dissimilar weld 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 to design and manufacture either individual or a set of specimens, which are customised to your specific requirements.

The specimens can be used as part of ASME XI Appendix VII training and VIII PDI programme.

RECOMMENDED FOR

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

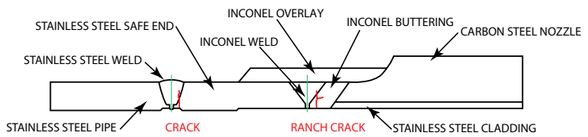
ALL SPECIMENS ARE SUPPLIED WITH

- 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



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.

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.

RECOMMENDED SET CONTAINS

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

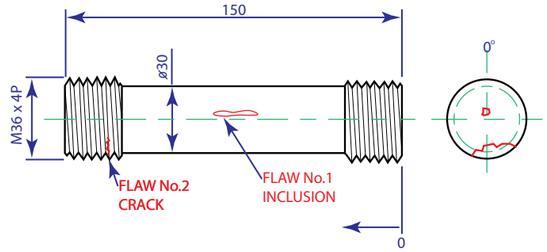
METHODS

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

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

EXAMPLE FOR WASTED BOLT



CUSTOM REFERENCE BLOCKS

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

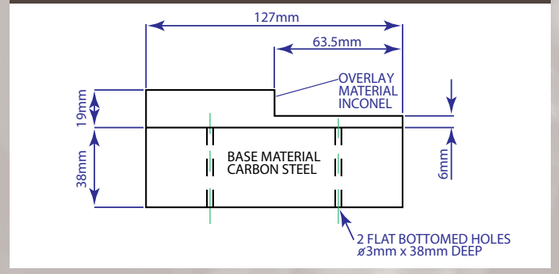
Our capabilities include NDE, Mechanical Inspection, CAD, Specialist Welding, Cladding Overlay, Machining, Bending/Rolling and Heat Treatment

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



LEARNING AND DEVELOPMENT PROGRAMMES

As part of our commitment to engineering industries, the Institution of Mechanical Engineers also provides a wide range of learning and development programmes; designed by engineers, for engineers.

Offering a broad portfolio of technical, leadership and management programmes, we help technical professionals develop the skills they need to transform their careers.

Our courses are mapped to UK-SPEC and can be delivered as public training courses or run in-company, for teams and individuals within your organisation.

PUBLIC PROGRAMMES

Delivered year-round in six locations around the UK

- London
- Manchester
- Glasgow
- Aberdeen
- Bristol
- Coventry

IN-COMPANY PROGRAMMES

Can be delivered at any location around the world for your organisation's convenience and tailored to your particular business needs.

We have experience in designing and delivering training programmes with global roll outs and offer experienced and engaging trainers, consultancy and coaching services and support in attaining professional registration.

Courses are available in a range of subjects including leading self, leading teams and leading a business as well as technical areas including engineering essentials, product lifecycle, railway.

Contact us today to find out how we can support your professional development.

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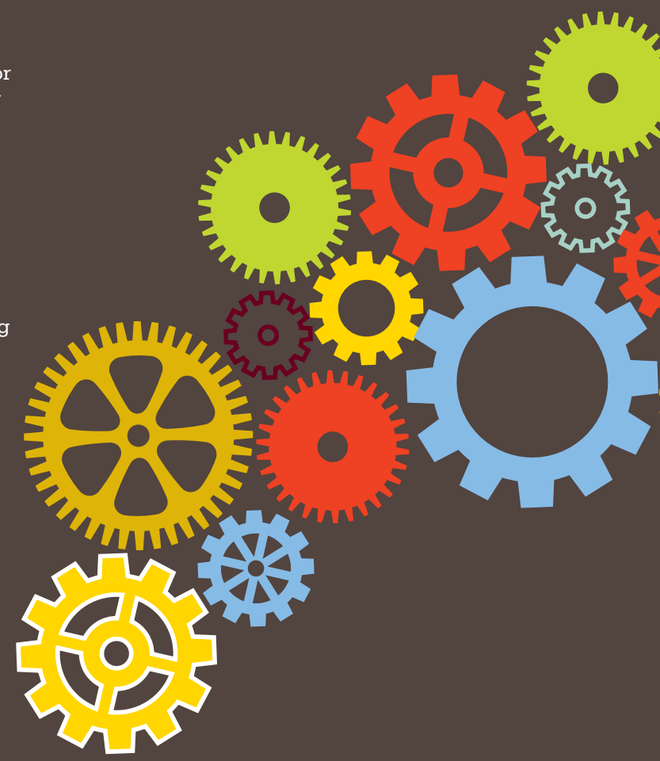

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