Commission of the European Communities
General Directorate XII
Joint Research Centre
Ispra Establishment

S.P./I.07.C1.86.60

Organisation for Economic Co-operation
and Development
Nuclear Energy Agency
Committee on the Safety
of Nuclear Installations
CSNI No. 119

Appendix 9 to PISC II Report No. 3

Detailed illustration of the defects present in Plate No. 3

Remark
Sizing of defects has to be performed on the radiographic films
Positives are included for illustration purpose only

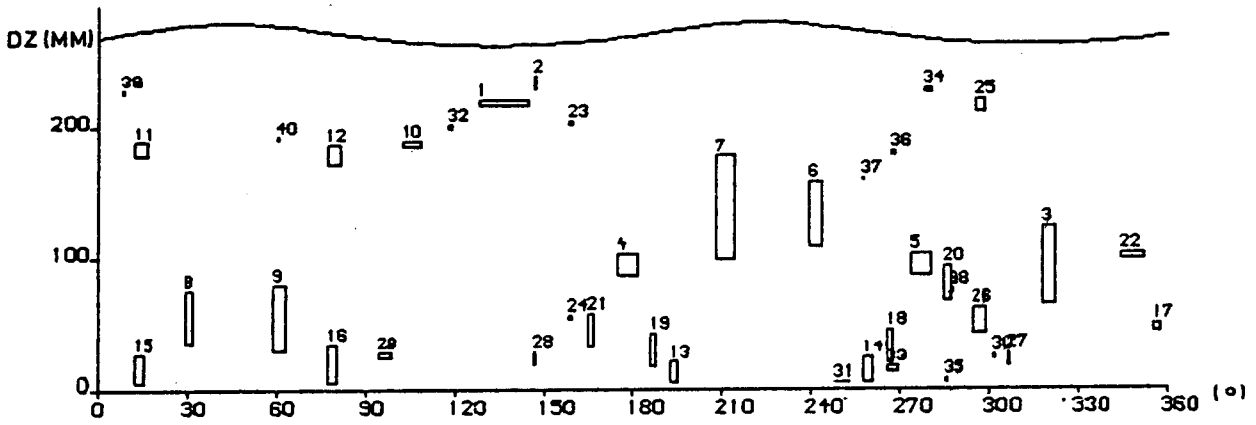
Programme for the Inspection of Steel Components

PISC

PISC II PLATE 3 **DEFECT Nr. 1**

DEFECT ENVELOPE COORDINATES **DEFECT ENVELOPE DIMENSIONS**

X_1 =	773 mm	X_2 =	778 mm	ΔX =	5 mm
Y_1 =	1730 mm	Y_2 =	1960 mm	ΔY =	230 mm
Z_1 =	217 mm	Z_2 =	222 mm	ΔZ =	5 mm



Defect type
Long slag inclusion

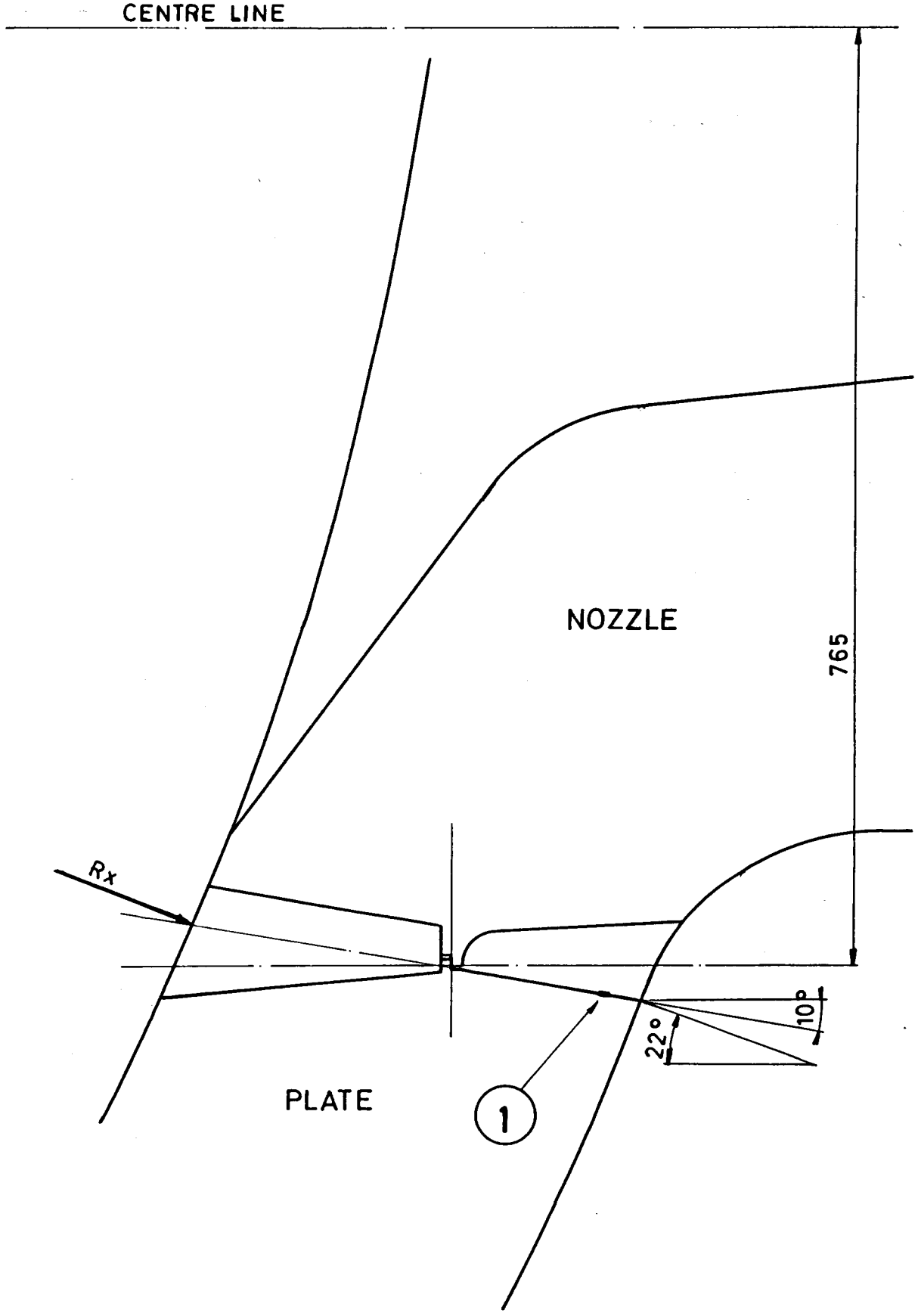
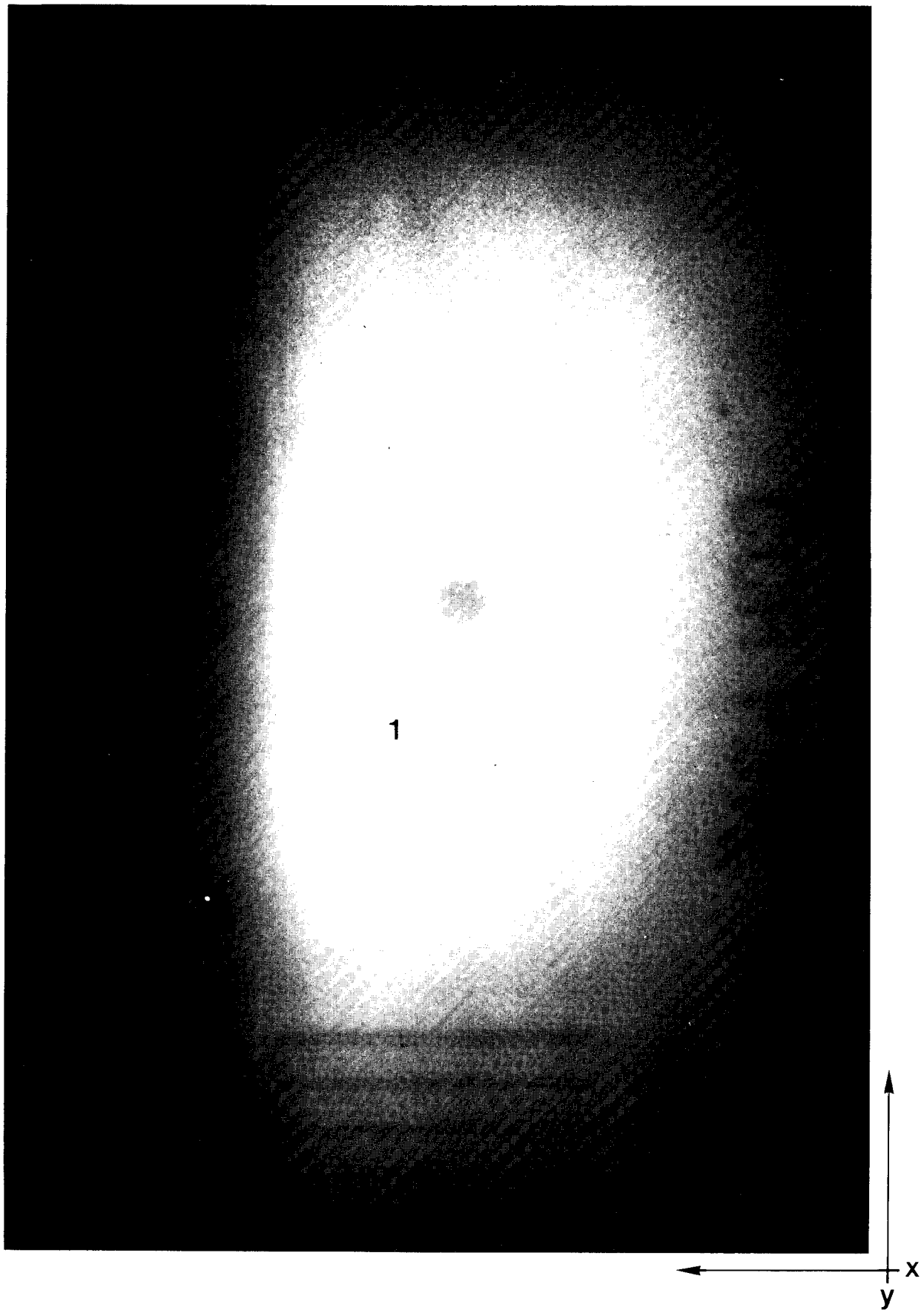

CENTRE LINE
NOZZLE
765
Rx
10°
22°
PLATE
1

Illustration of defect No. 1



PISC II PLATE 3

DEFECT Nr. 2

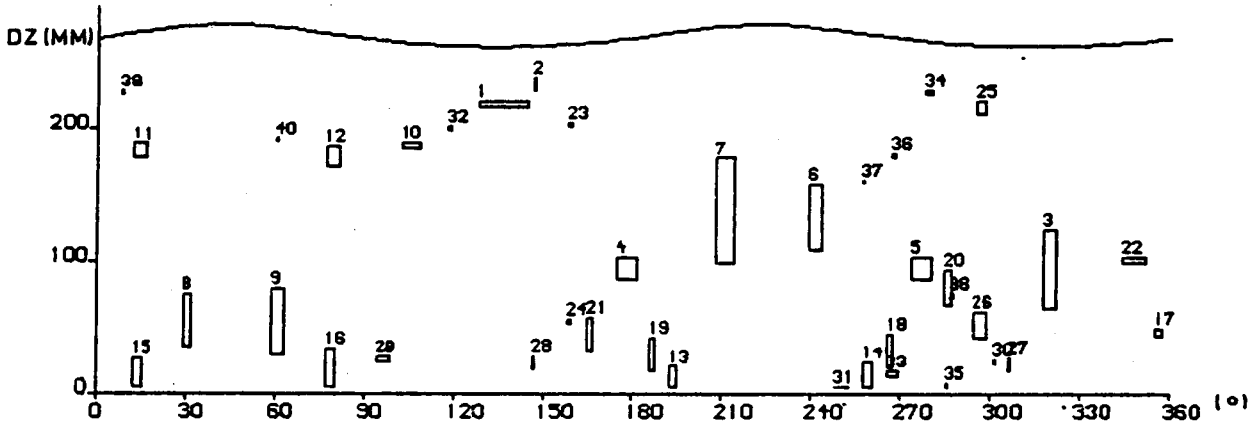
DEFECT ENVELOPE COORDINATES

X_1 = 736 mm
Y_1 = 1883 mm
Z_1 = 229 mm

X_2 = 736,5 mm
Y_2 = 1893 mm
Z_2 = 239 mm

DEFECT ENVELOPE DIMENSIONS

ΔX = 0,5 mm
ΔY = 10 mm
ΔZ = 10 mm



Defect type ;
Planar sharp and smooth defect
Circular defect

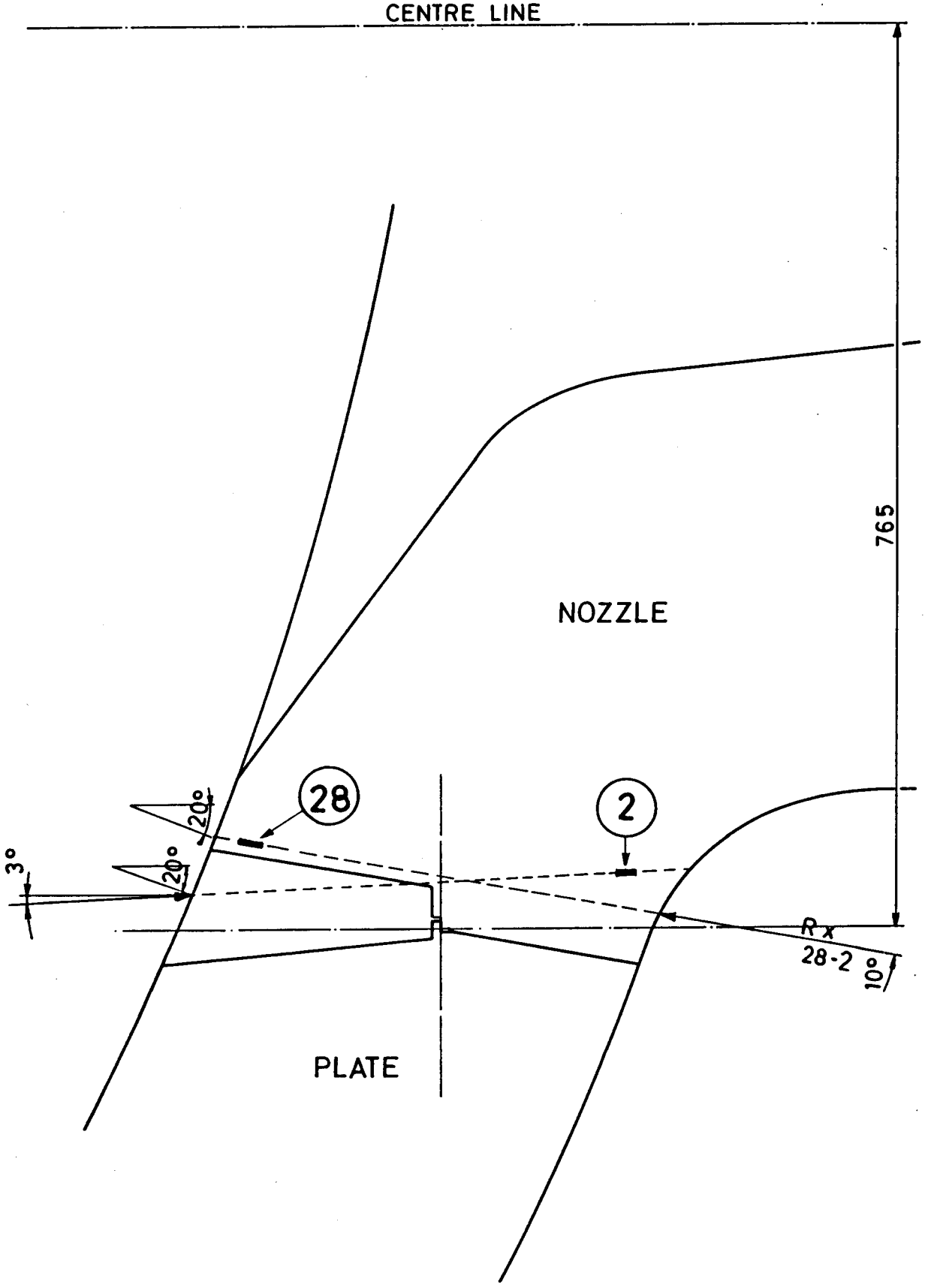
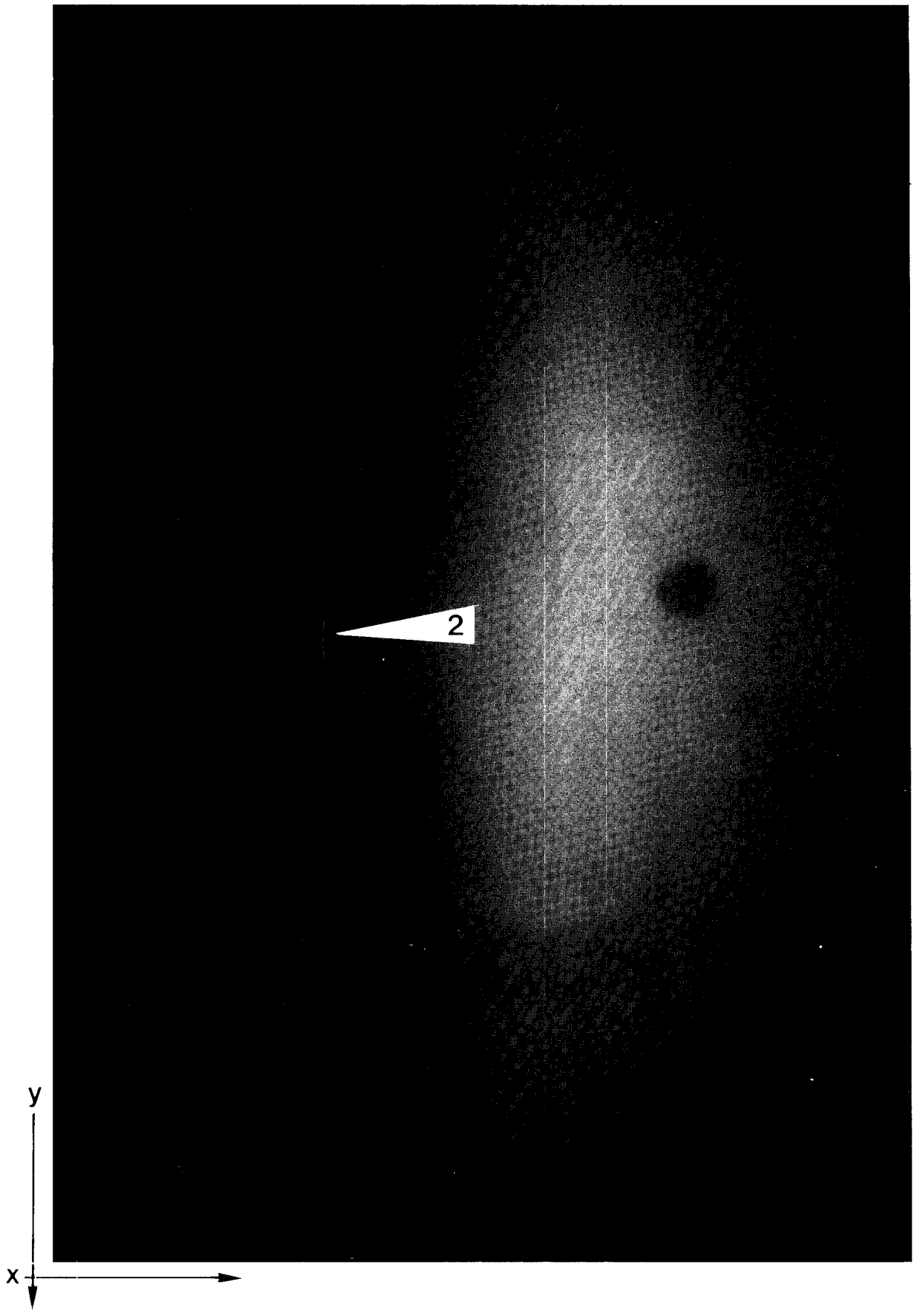

CENTRE LINE
765
NOZZLE
28
2
20°
20°
3°
Rx
28-2
10°
PLATE

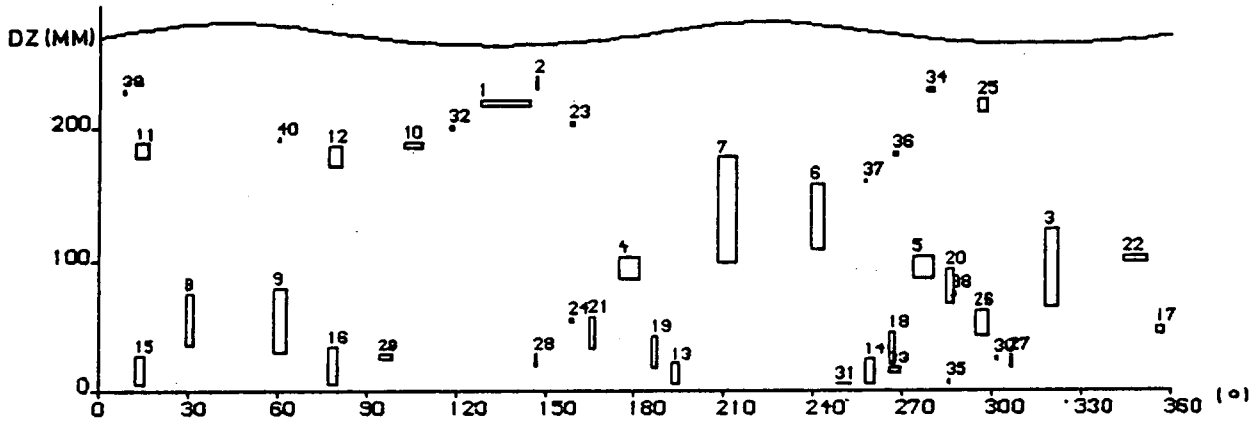
Illustration of defect No. 2



PISC II PLATE 3 **DEFECT Nr. 3**

DEFECT ENVELOPE COORDINATES **DEFECT ENVELOPE DIMENSIONS**

X_1 =	716 mm	X_2 =	718 mm	ΔX =	2 mm
Y_1 =	3975 mm	Y_2 =	4038 mm	ΔY =	63 mm
Z_1 =	64 mm	Z_2 =	124 mm	ΔZ =	60 mm



Defect type :
Unrealistic smooth planar defect
Large square giving a link with the PISC I exercise

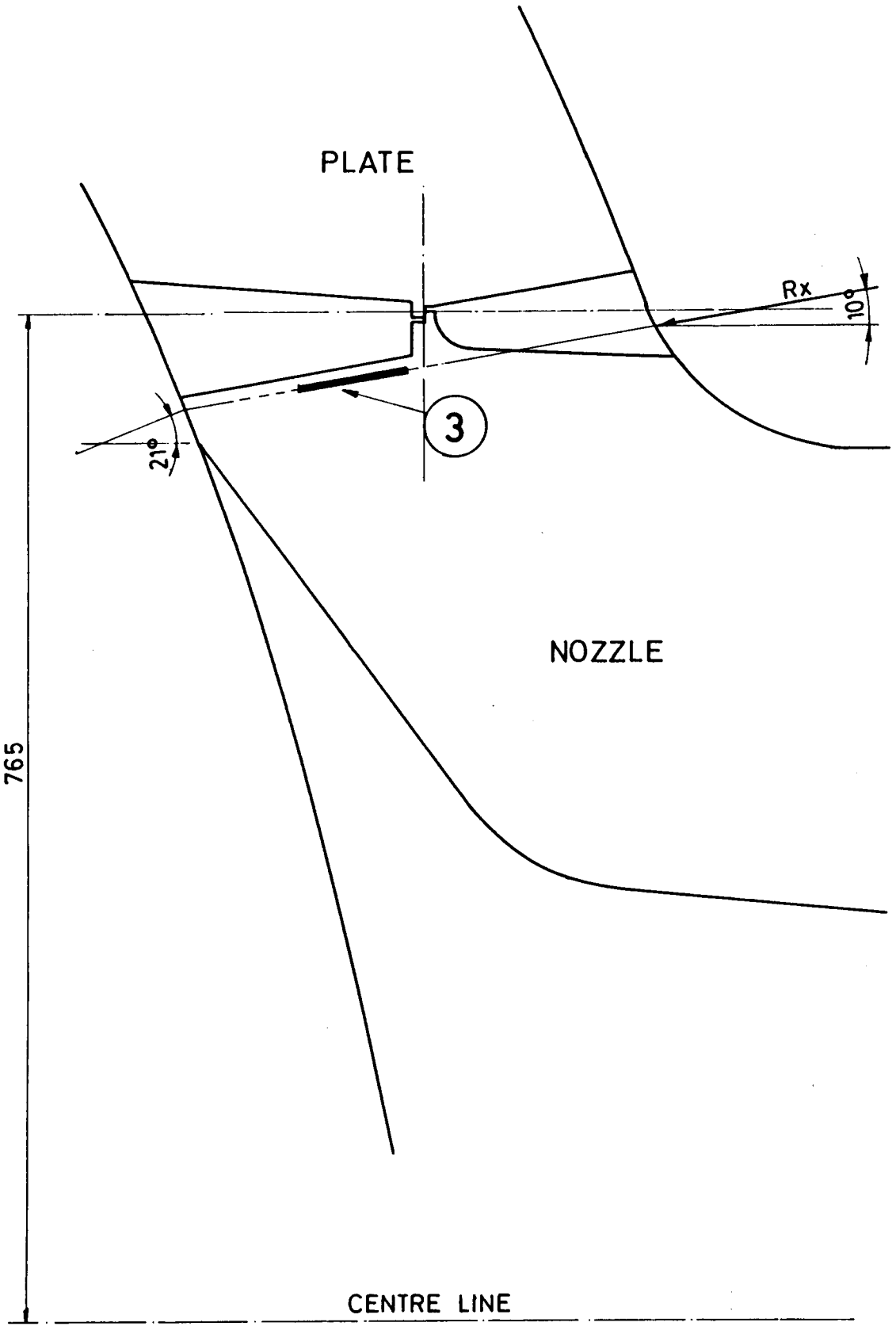
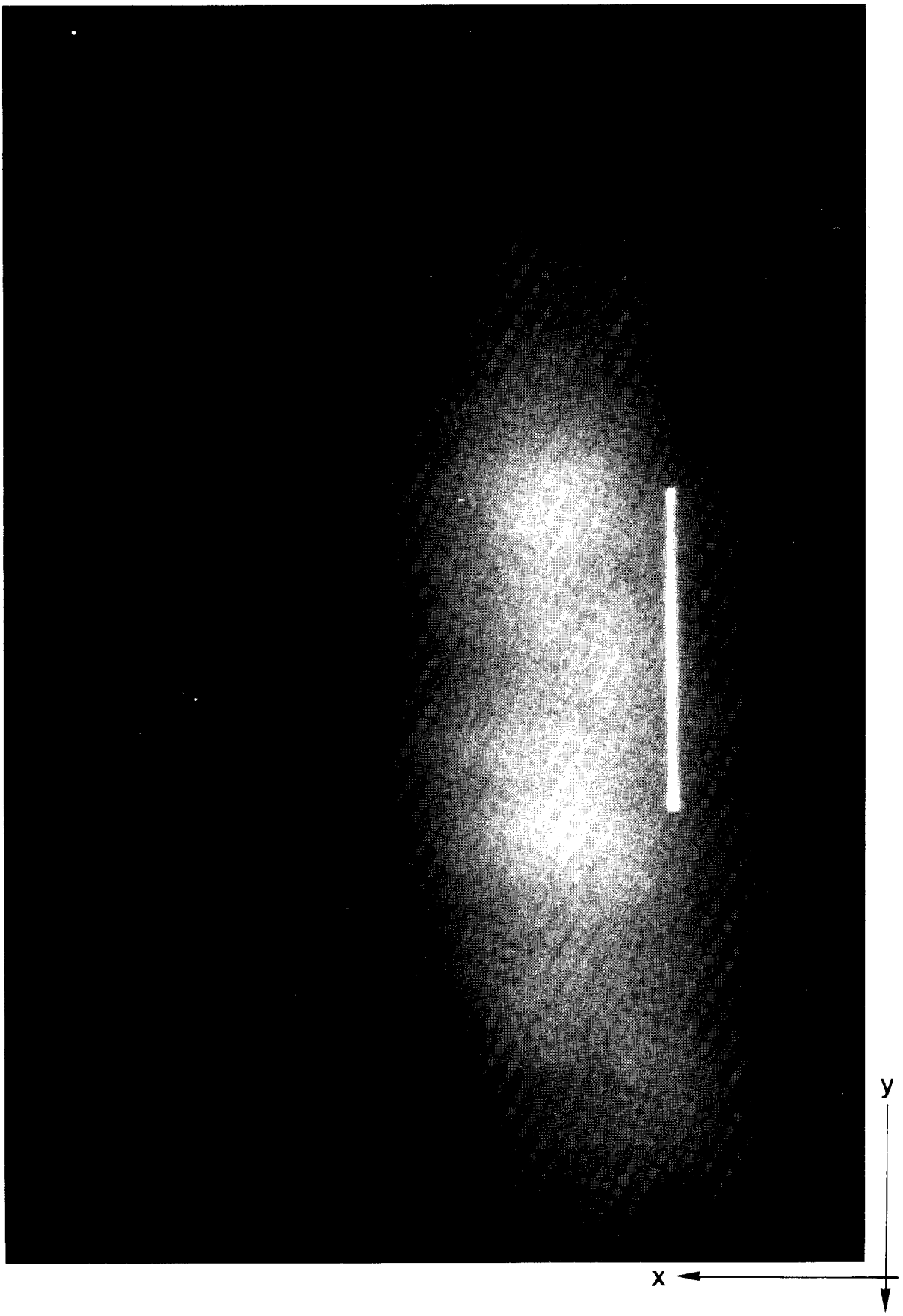


PLATE
Rx
10°
3
21°
NOZZLE
765
CENTRE LINE

Illustration of defect No. 3



PISC II PLATE 3

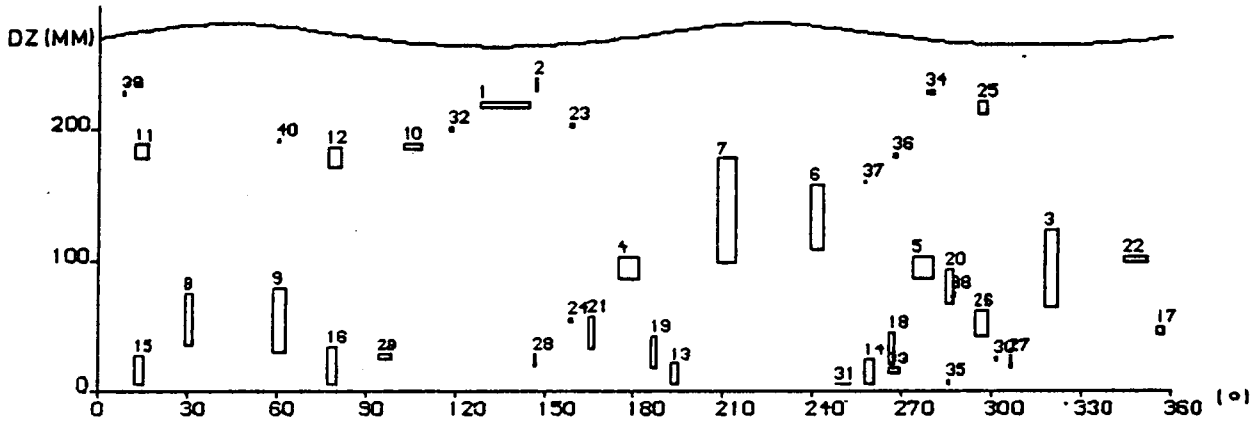
DEFECT Nr. 4

DEFECT ENVELOPE COORDINATES

X_1 = 727 mm	X_2 = 730 mm	
Y_1 = 2219 mm	Y_2 = 2304 mm	
Z_1 = 86.5 mm	Z_2 = 103.5 mm	

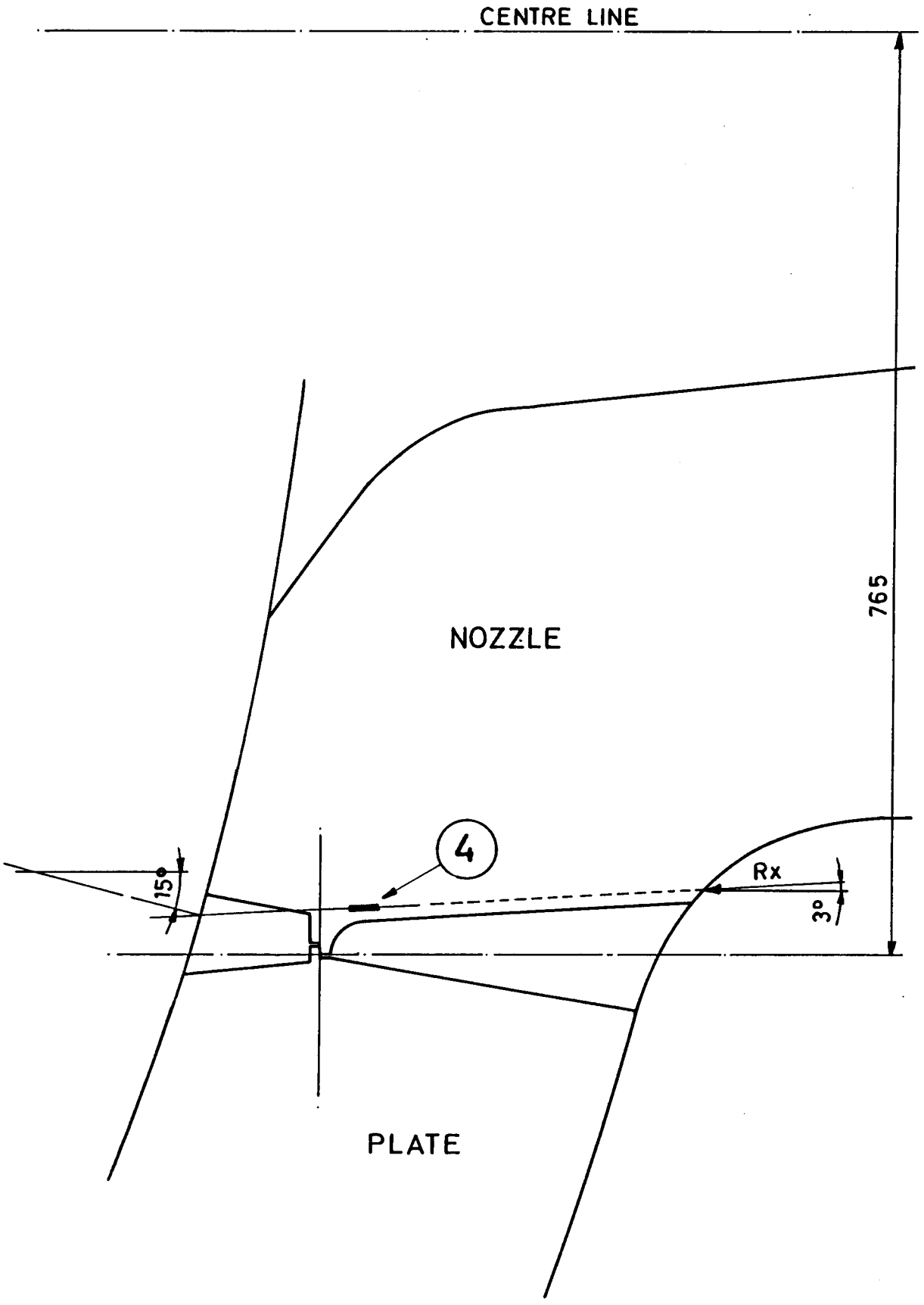
DEFECT ENVELOPE DIMENSIONS

ΔX = 3 mm	
ΔY = 85 mm	
ΔZ = 17 mm	



Defect type :
Smooth sharp planar defect with starter
Long strip

Radiograph insufficiently contrasted.
No positive available for illustration.


CENTRE LINE
765
NOZZLE
4
15°
Rx
3°
PLATE

PISC II PLATE 3 DEFECT Nr. 5

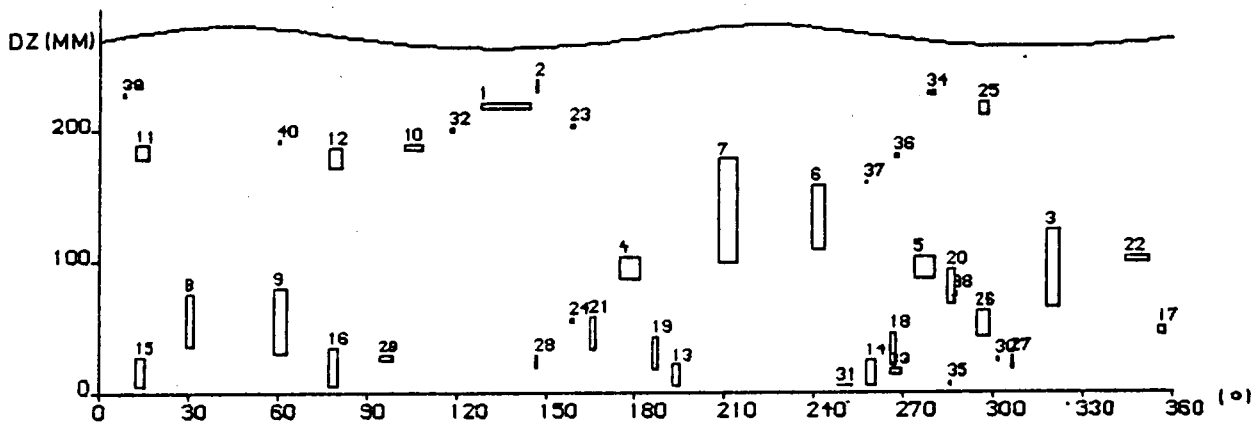
DEFECT ENVELOPE COORDINATES

X_1 = 728 mm
Y_1 = 3484 mm
Z_1 = 86.5 mm

X_2 = 732 mm
Y_2 = 3560 mm
Z_2 = 103.5 mm

DEFECT ENVELOPE DIMENSIONS

ΔX = 4 mm
ΔY = 85 mm
ΔZ = 17 mm



Defect type :
Rough planar defect
Long strip

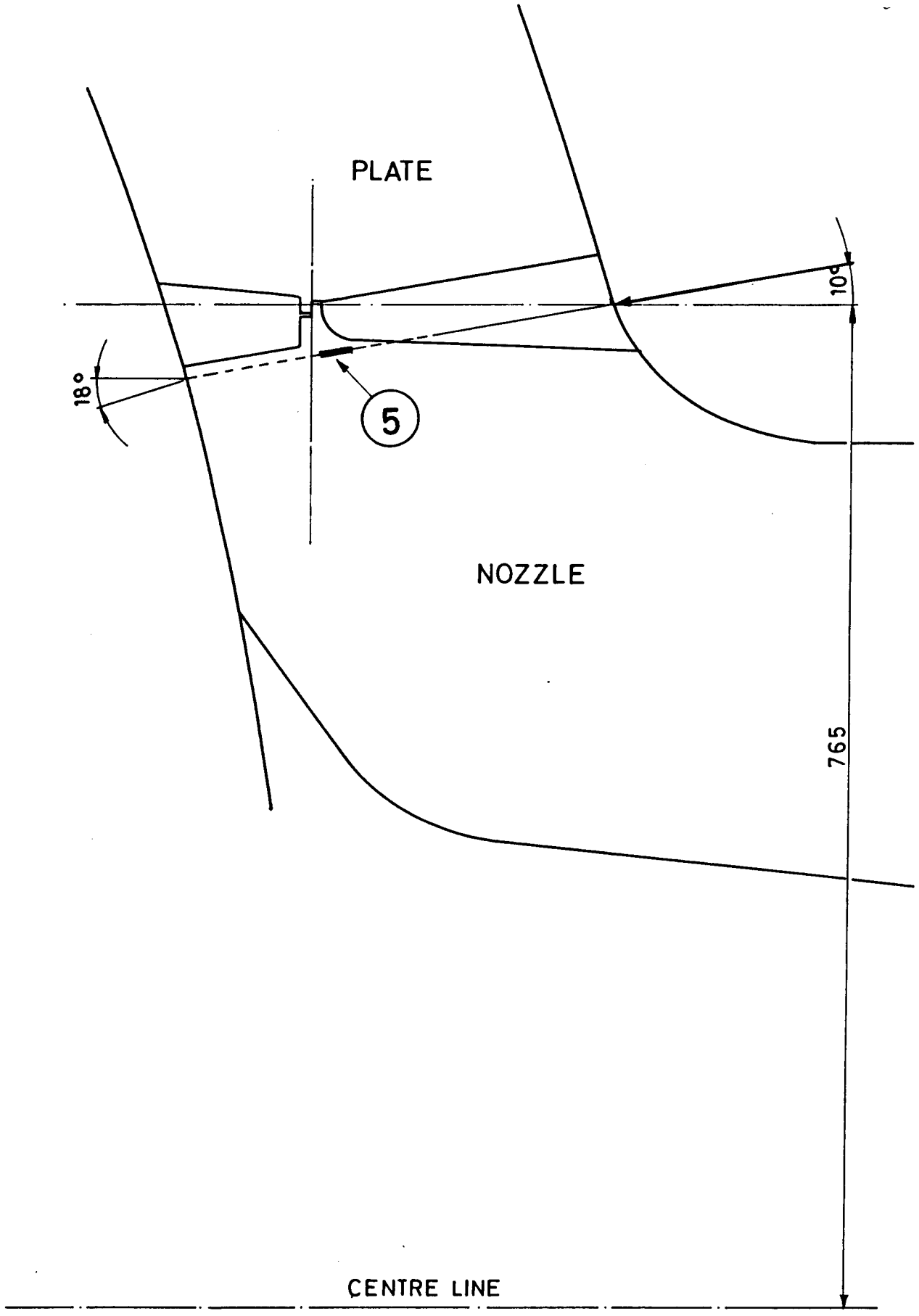
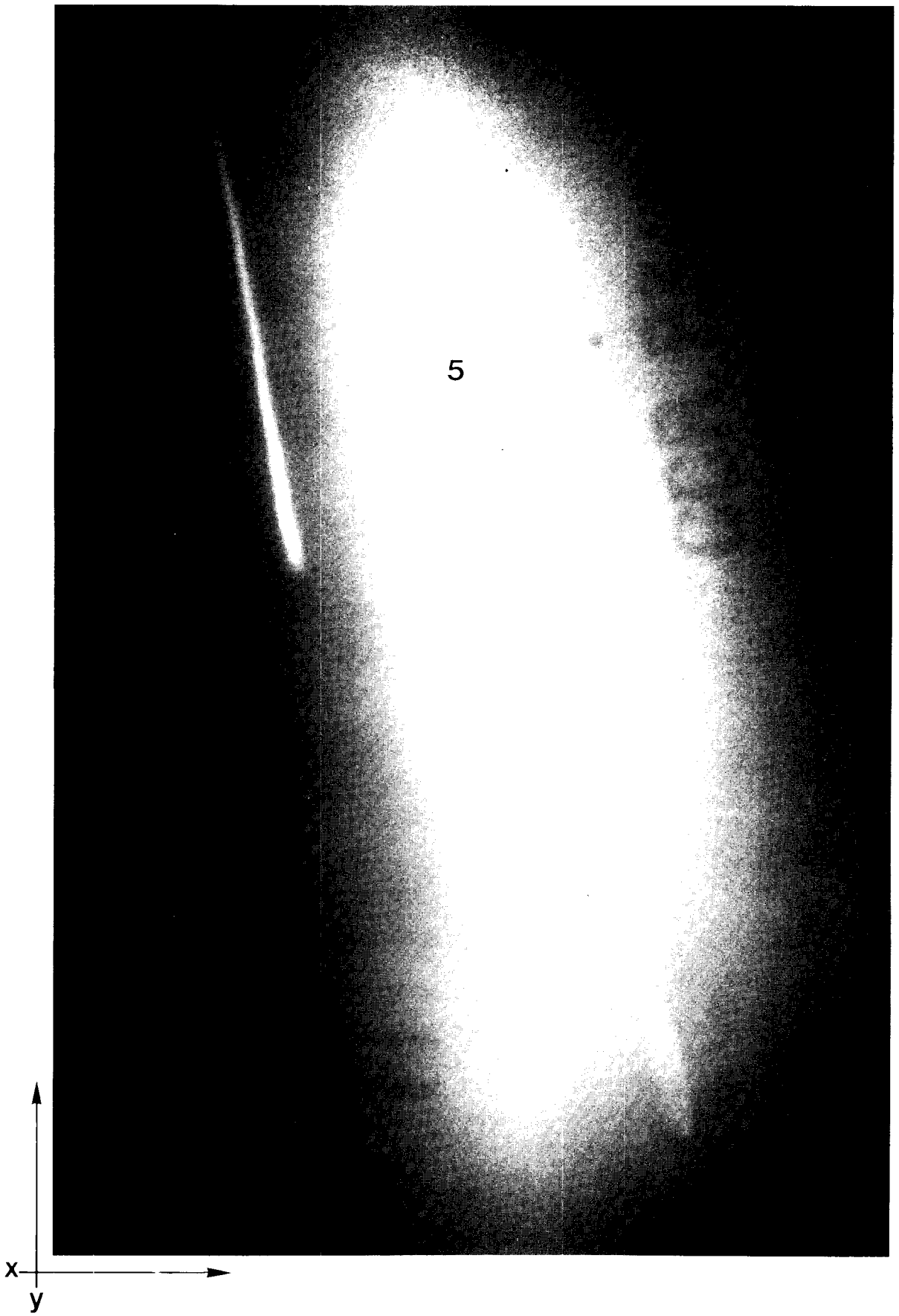


PLATE
10°
18°
5
NOZZLE
765
CENTRE LINE

Illustration of defect No. 5

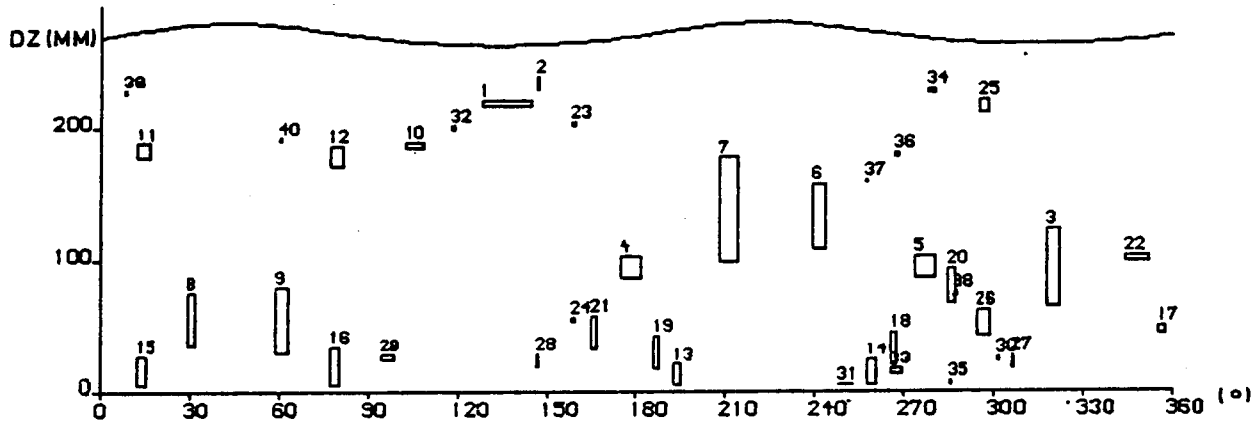


PISC II PLATE 3 DEFECT Nr. 6

DEFECT ENVELOPE COORDINATES

X_1 = 796 mm	X_2 = 802 mm	ΔX = 6 mm
Y_1 = 3331 mm	Y_2 = 3390 mm	ΔY = 59 mm
Z_1 = 108 mm	Z_2 = 158 mm	ΔZ = 50 mm

DEFECT ENVELOPE DIMENSIONS



Defect type :
Composit defect made of several smooth sharp planar circular defects

Radiograph insufficiently contrasted.
No positive available for illustration.

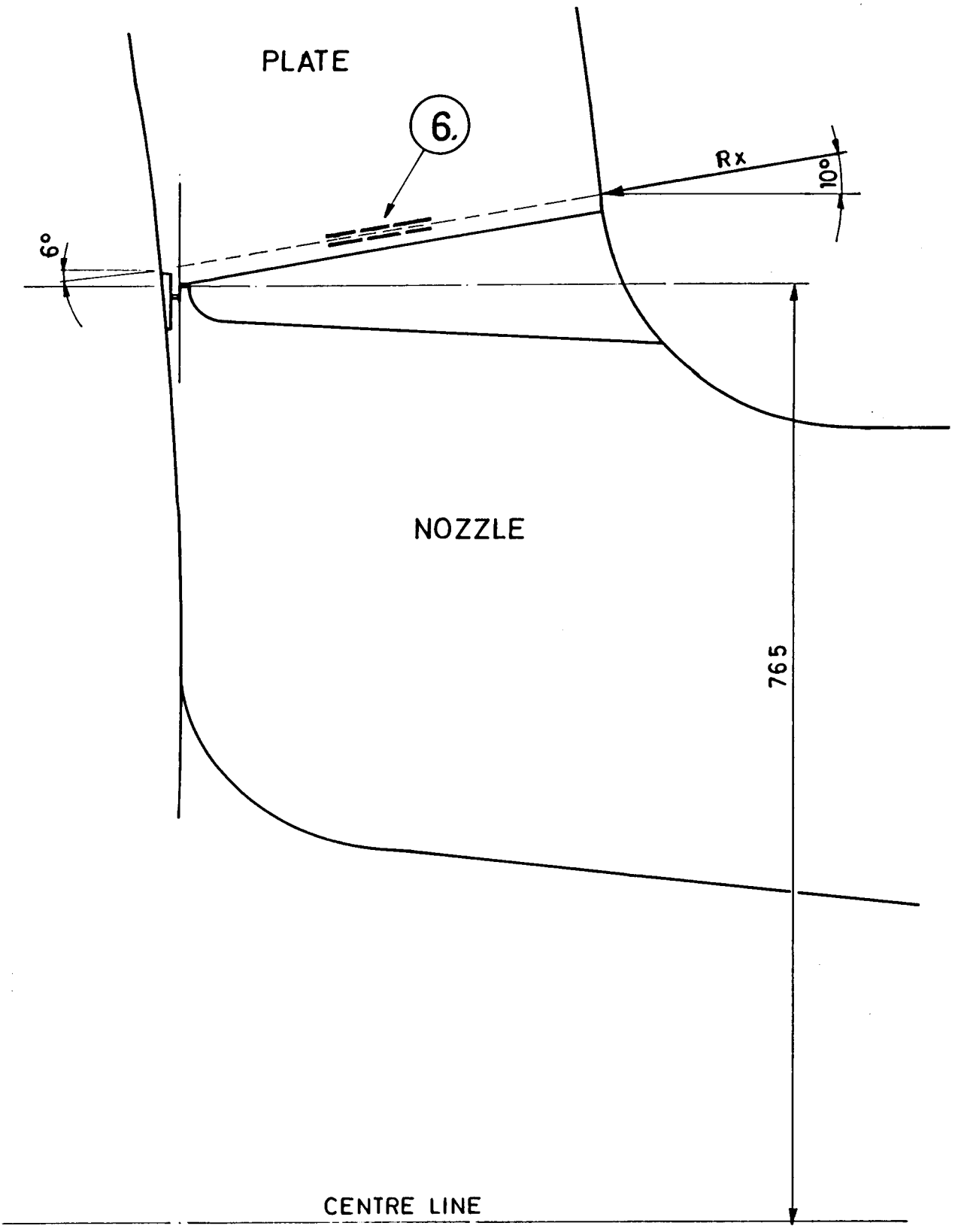


PLATE
6.
Rx
10°
6°
NOZZLE
765
CENTRE LINE

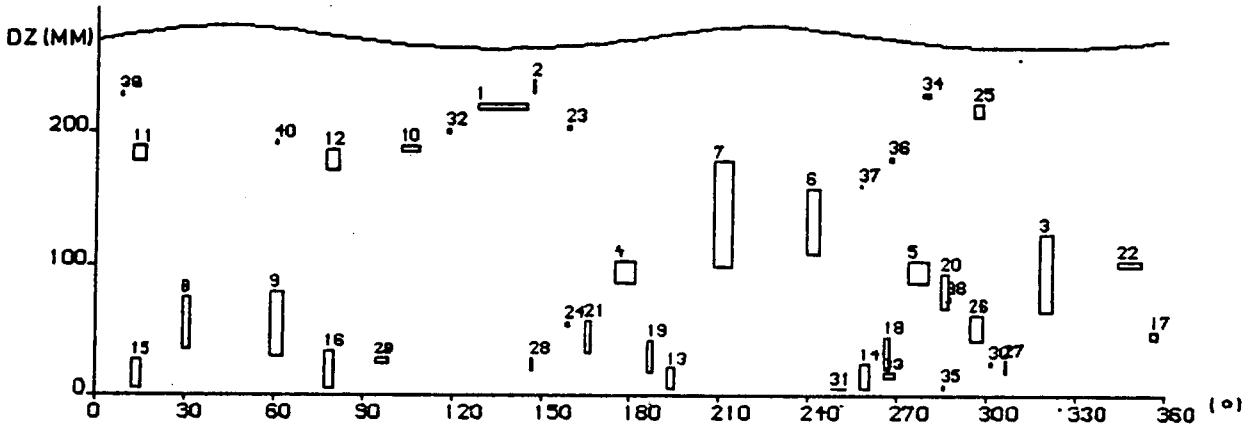
PISC II PLATE 3

DEFECT Nr. 7

DEFECT ENVELOPE COORDINATES

X_1 = 796 mm	X_2 = 802 mm	ΔX = 6 mm
Y_1 = 2895 mm	Y_2 = 2979 mm	ΔY = 84 mm
Z_1 = 98 mm	Z_2 = 178 mm	ΔZ = 80 mm

DEFECT ENVELOPE DIMENSIONS



Defect type :
Composit defect made of several smooth sharp planar circular defect

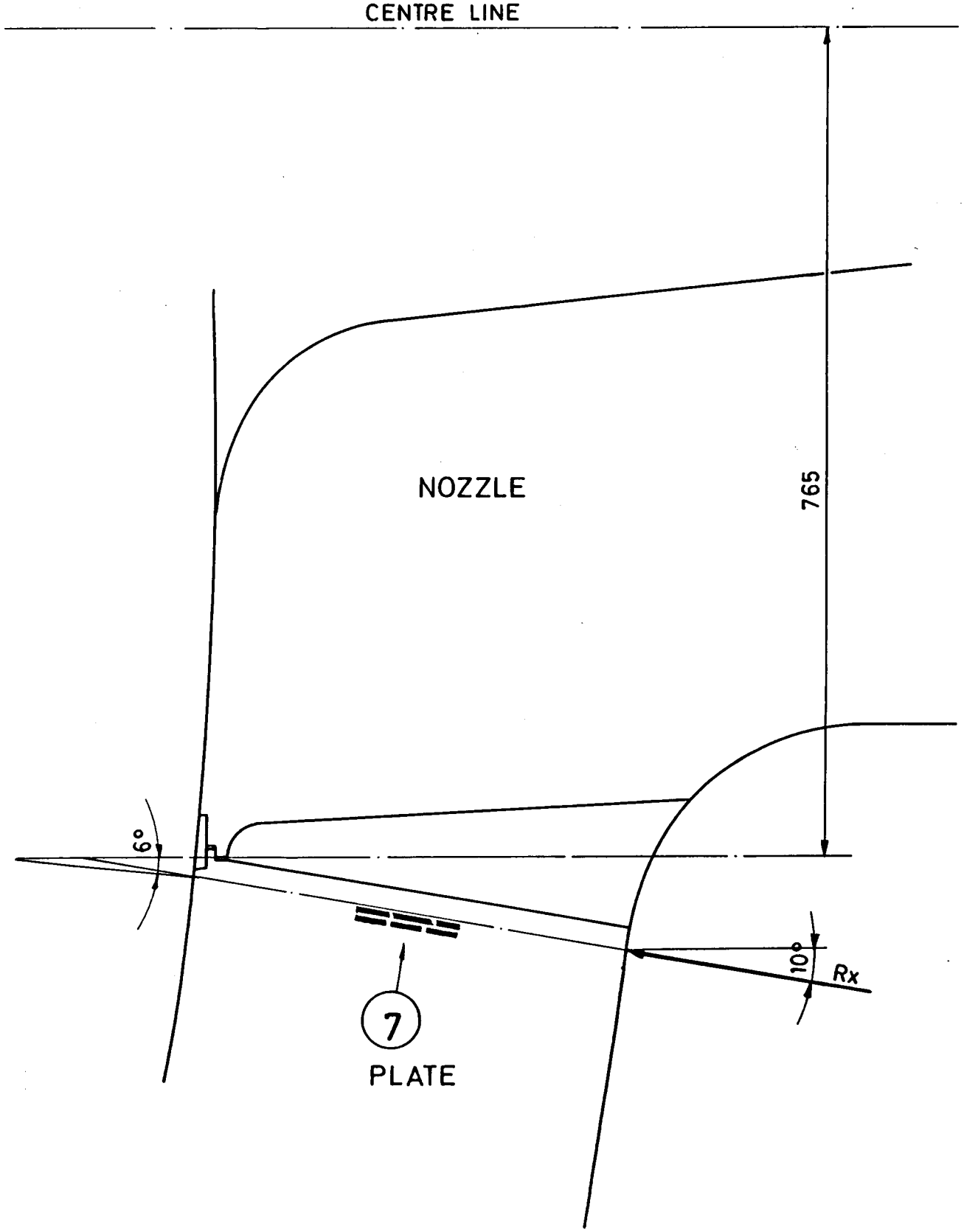
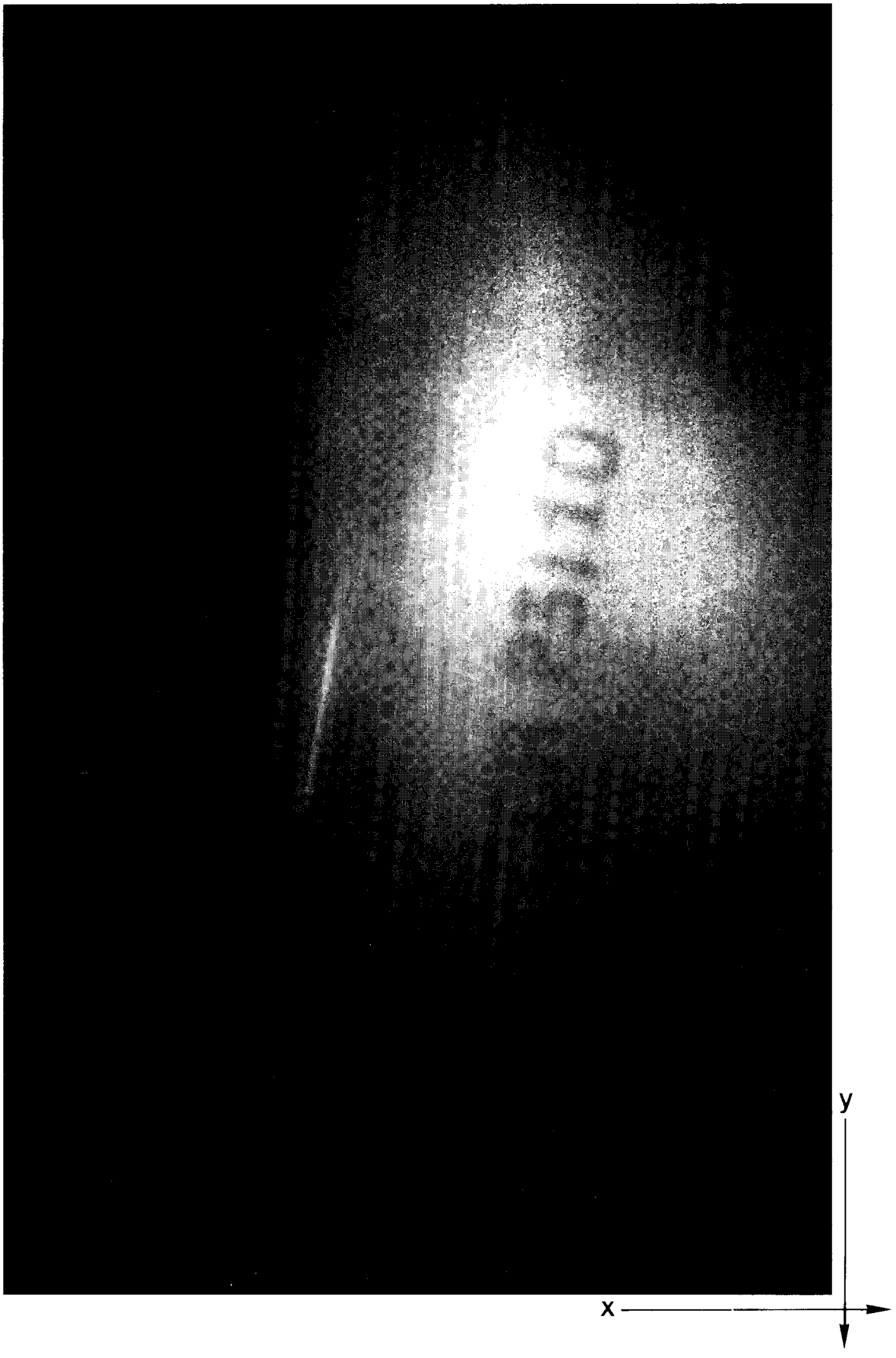

CENTRE LINE
NOZZLE
765
6°
10°
Rx
7
PLATE

Illustration of defect No. 7



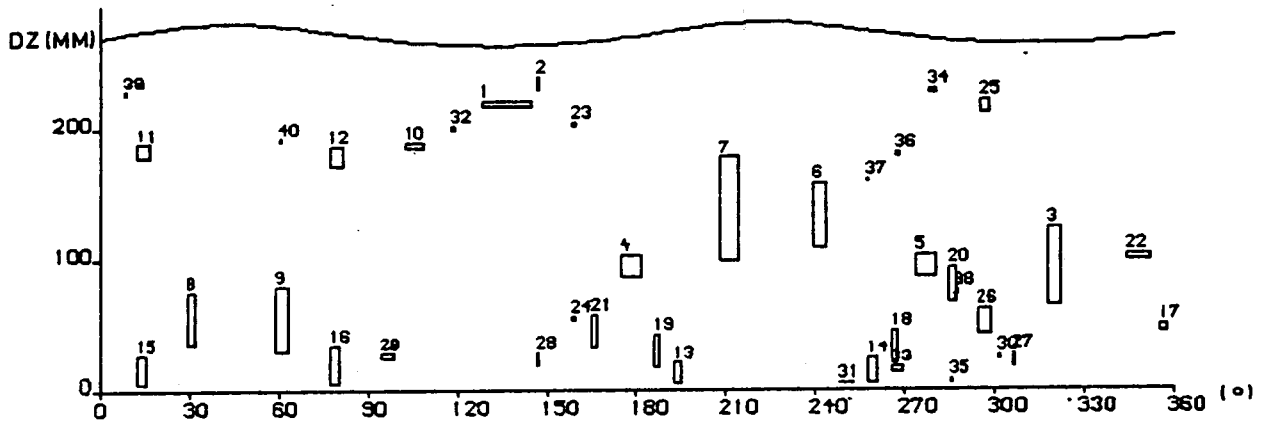
PISC II PLATE 3

DEFECT Nr. 8

DEFECT ENVELOPE COORDINATES

DEFECT ENVELOPE DIMENSIONS

X_1	=	787	mm	X_2	= 799	mm	ΔX =	12 mm
Y_1	=	402	mm	Y_2	= 442	mm	ΔY =	40 mm
Z_1	=	35	mm	Z_2	= 75	mm	ΔZ =	40 mm



Defect type :
Composit defect made of several smooth sharp planar circular defects

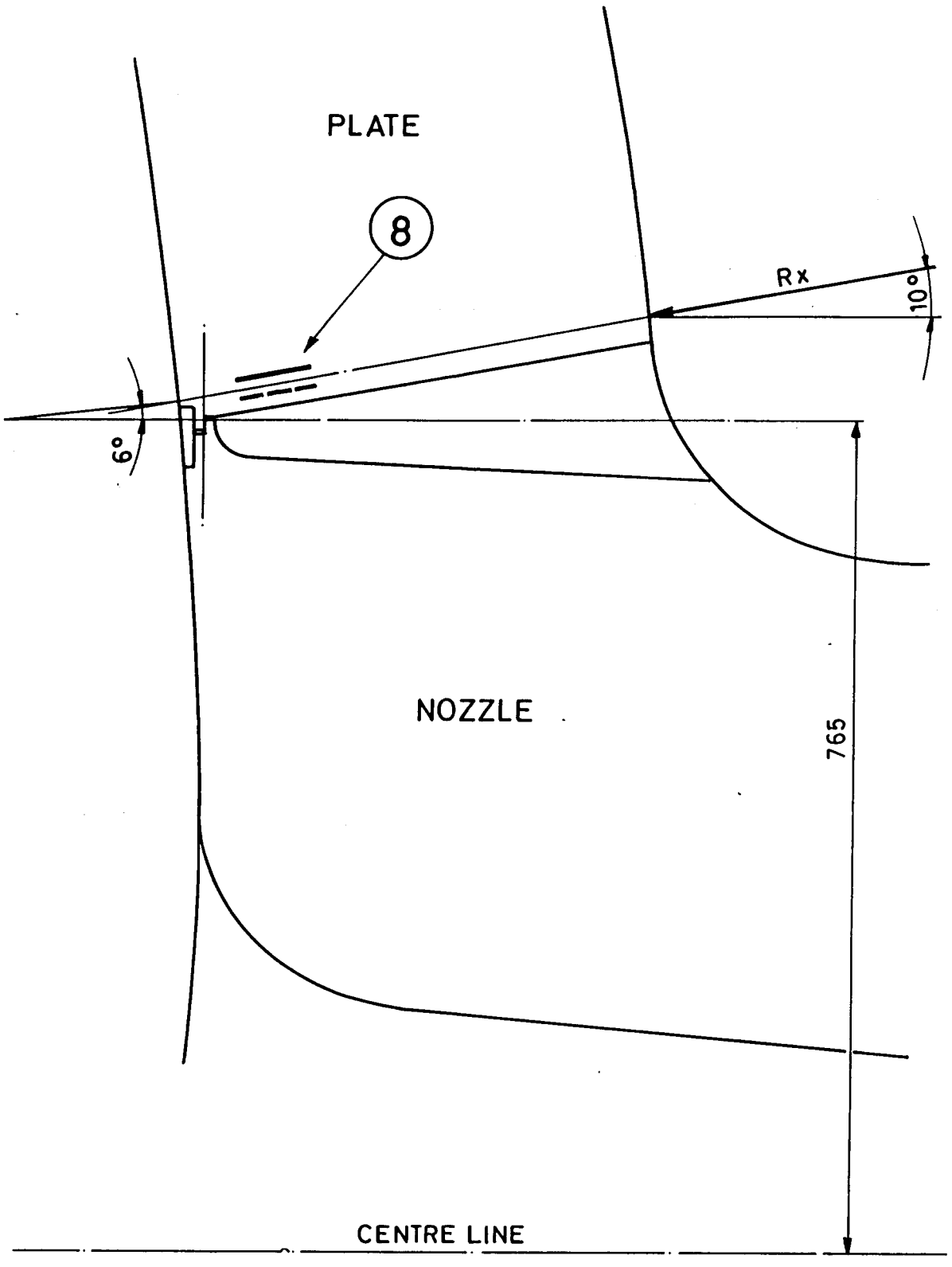
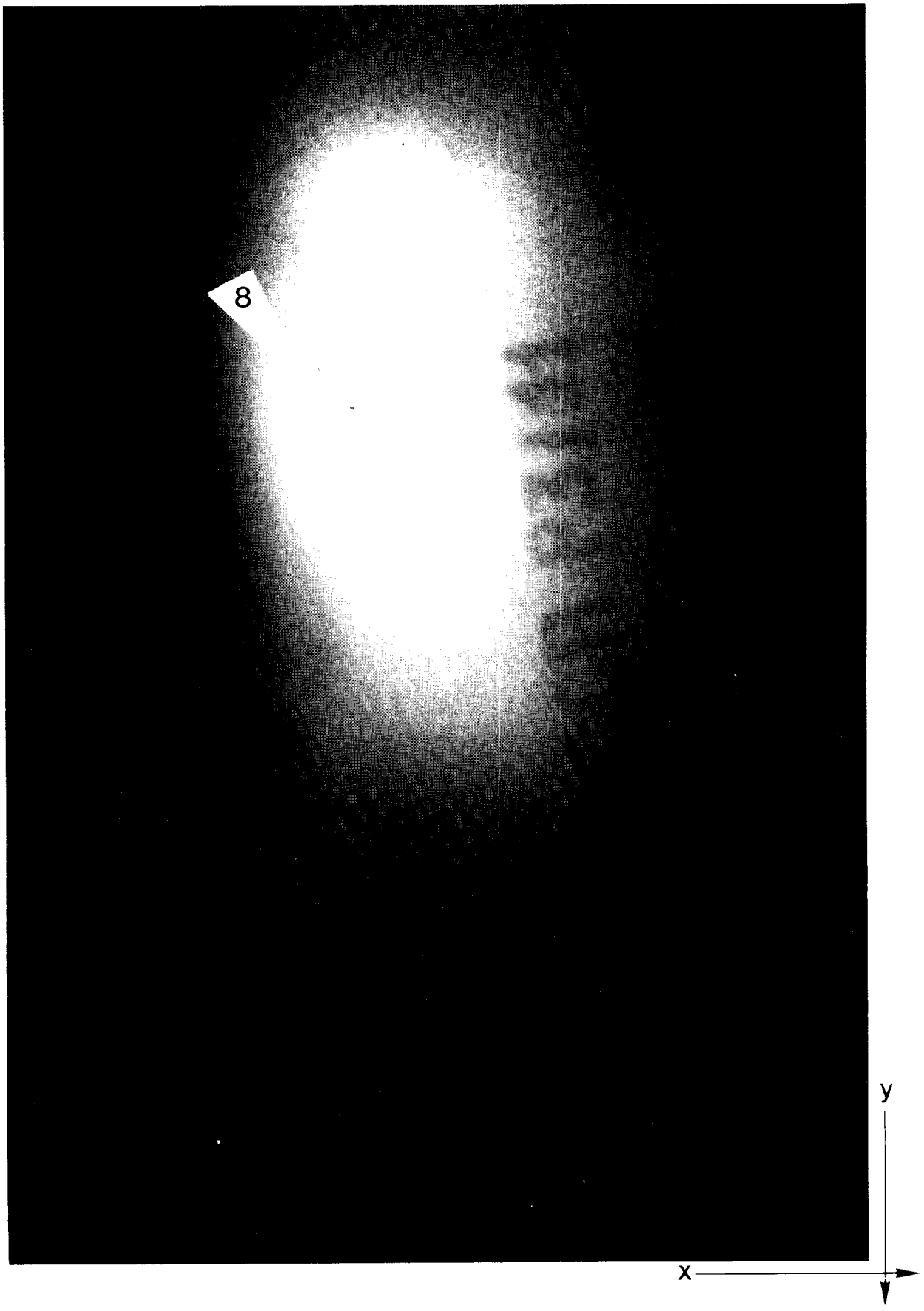


PLATE
8
Rx
10°
6°
NOZZLE
765
CENTRE LINE

Illustration of defect No. 8

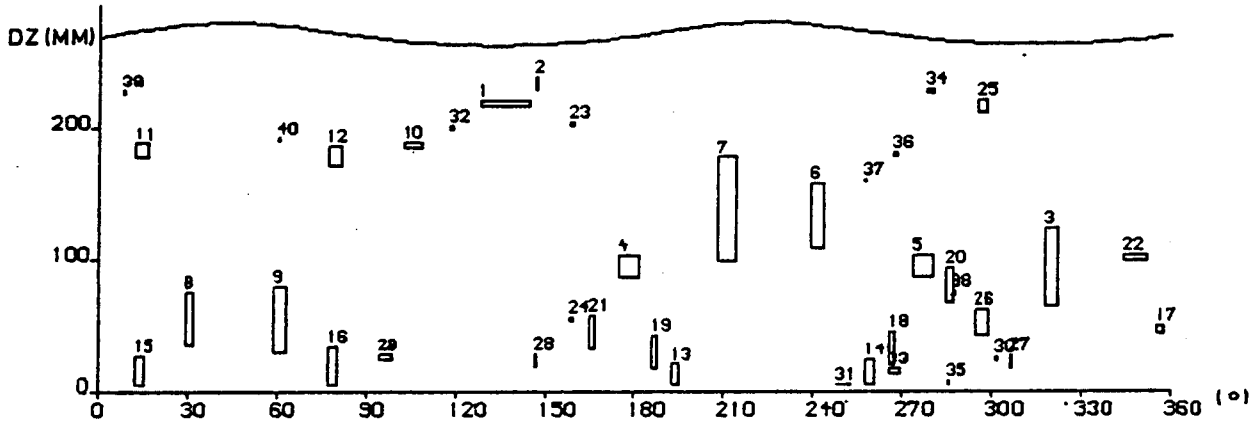


DEFECT ENVELOPE COORDINATES

X_1 = 785 mm	X_2 = 797 mm	
Y_1 = 814 mm	Y_2 = 869 mm	
Z_1 = 30 mm	Z_2 = 80 mm	

DEFECT ENVELOPE DIMENSIONS

ΔX = 12 mm	
ΔY = 55 mm	
ΔZ = 50 mm	



Defect type:
Composit defect made of several smooth sharp planar circular defects

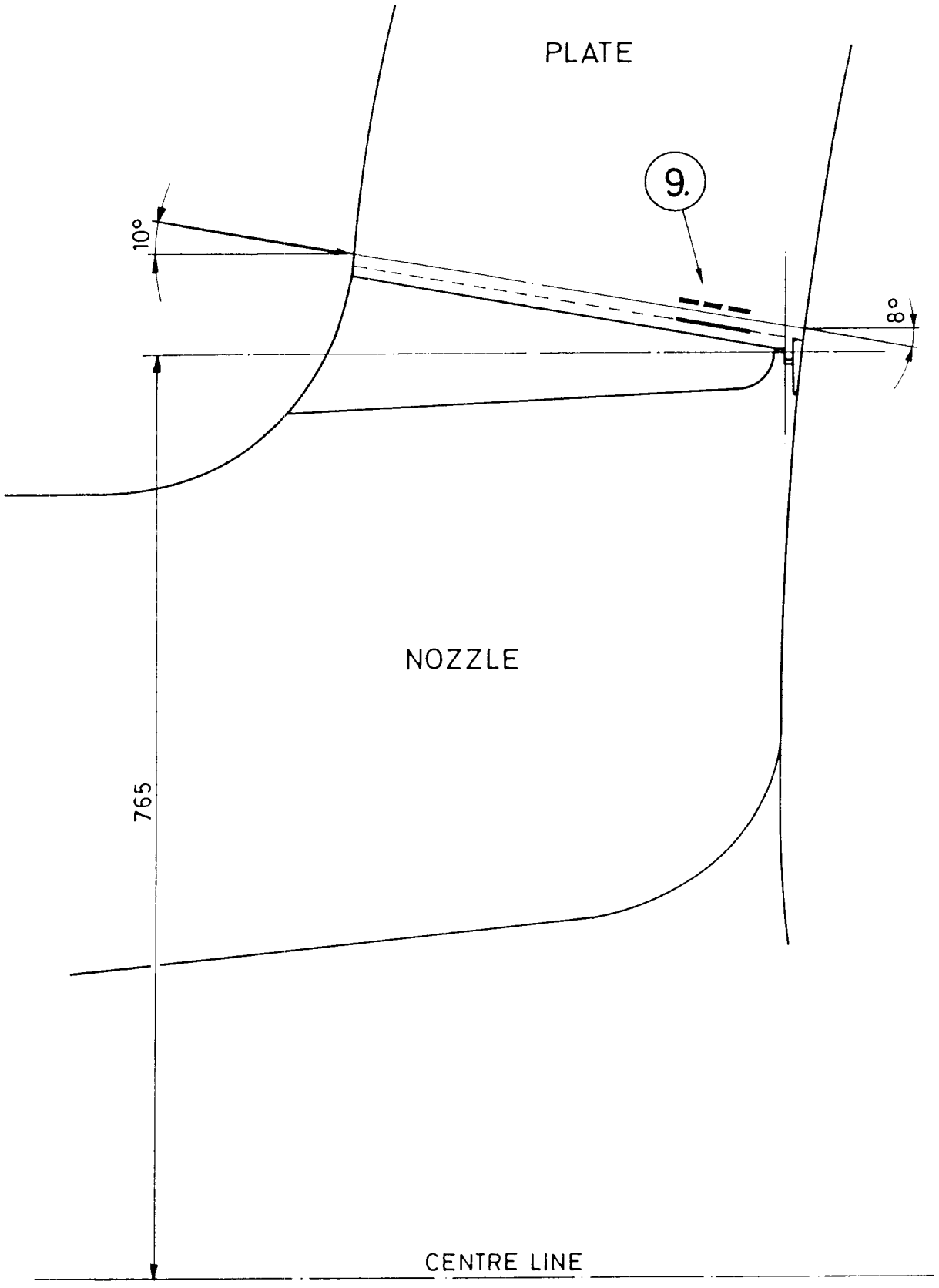
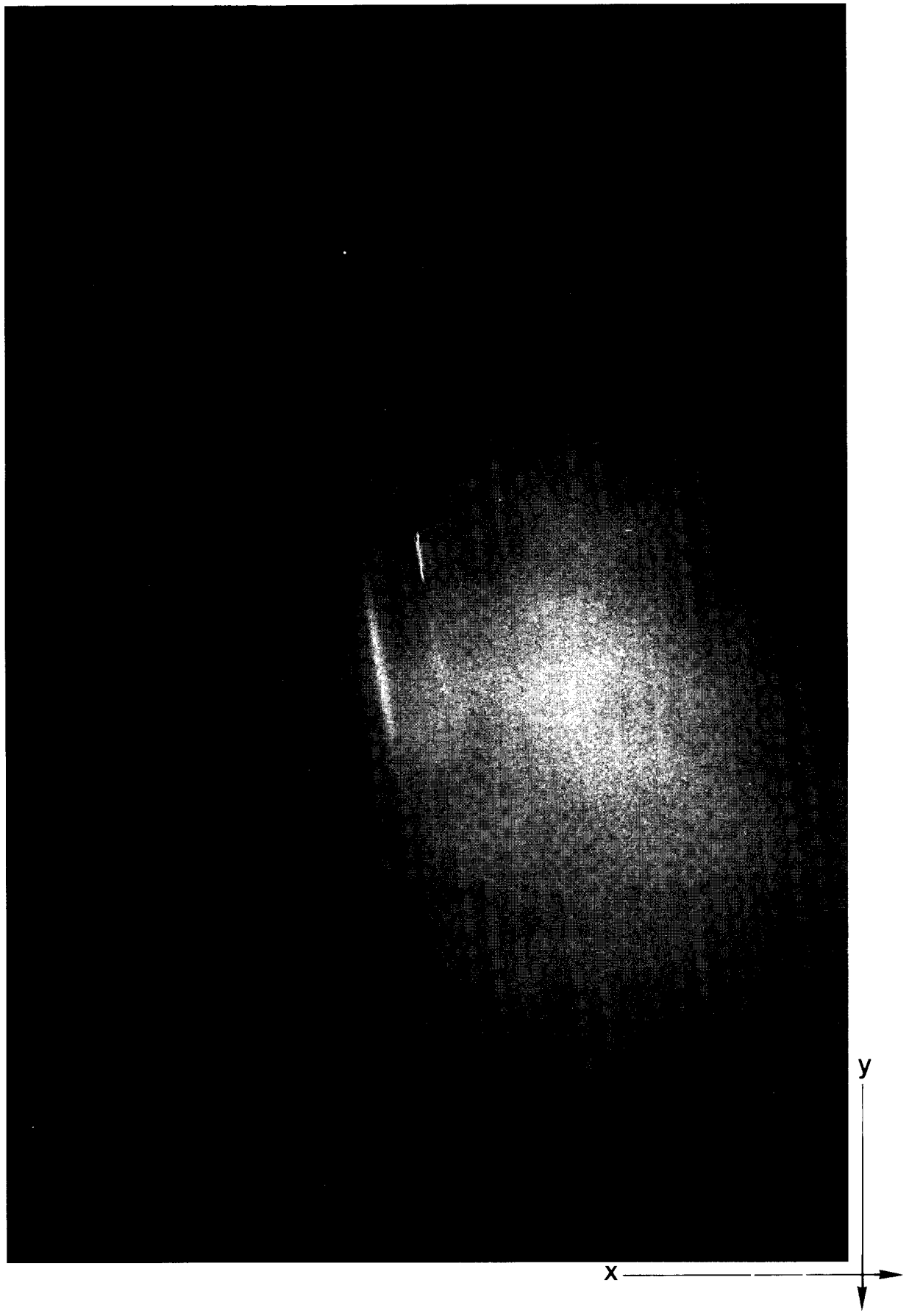


PLATE
9.
10°
8°
NOZZLE
765
CENTRE LINE

Illustration of defect No. 9



PISC II PLATE 3

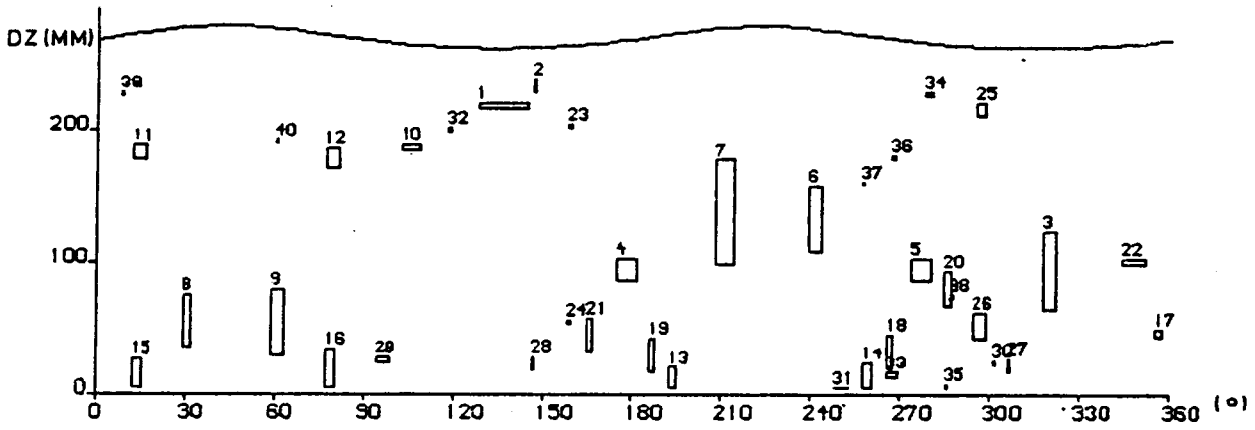
DEFECT Nr. 10

DEFECT ENVELOPE COORDINATES

X_1	=	740	mm	X_2	=	743	mm	
Y_1	=	1322	mm	Y_2	=	1407	mm	
Z_1	=	186	mm	Z_2	=	190	mm	

DEFECT ENVELOPE DIMENSIONS

ΔX =	3	mm
ΔY =	82	mm
ΔZ =	4	mm



Defect type:
Long slag inclusion

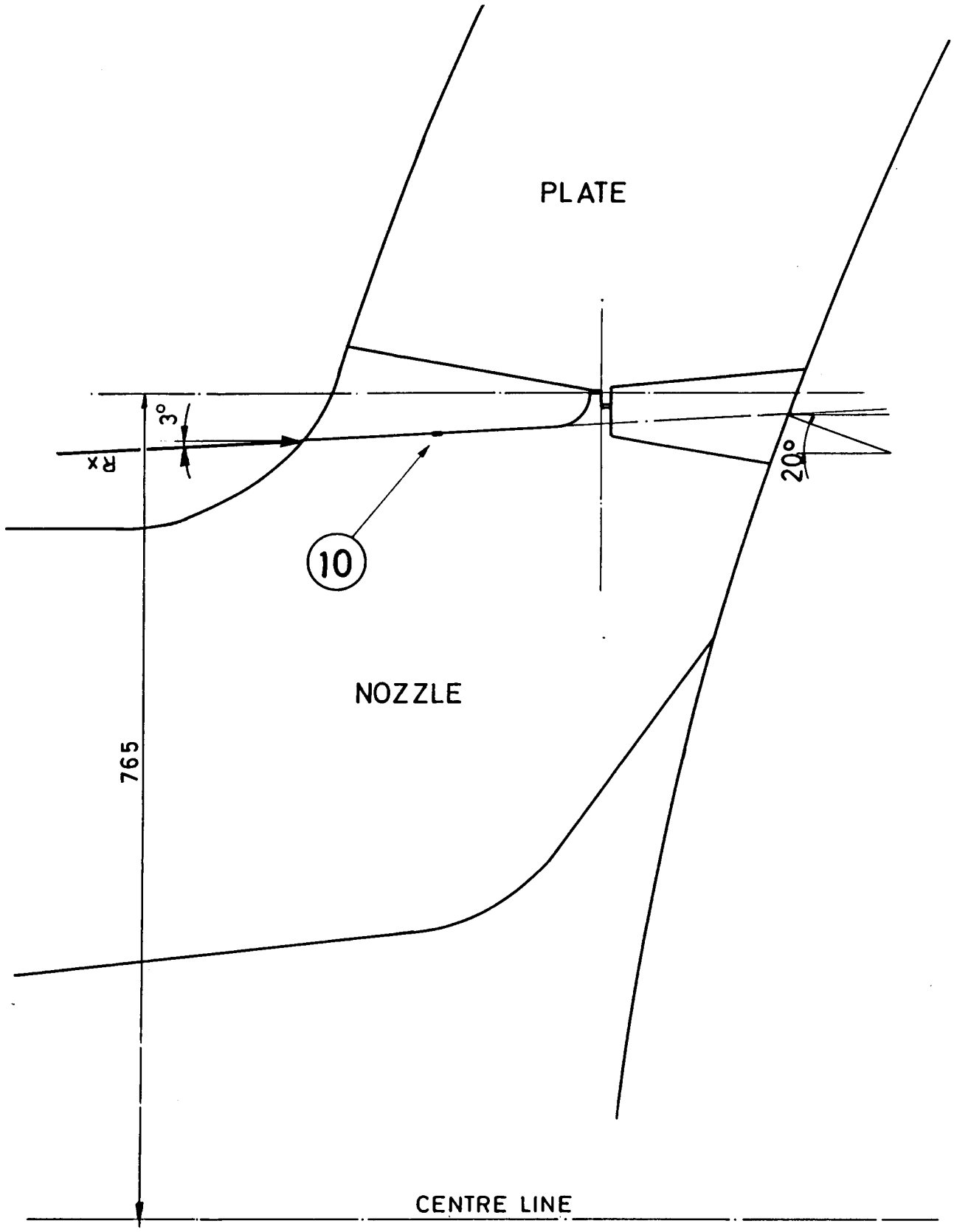
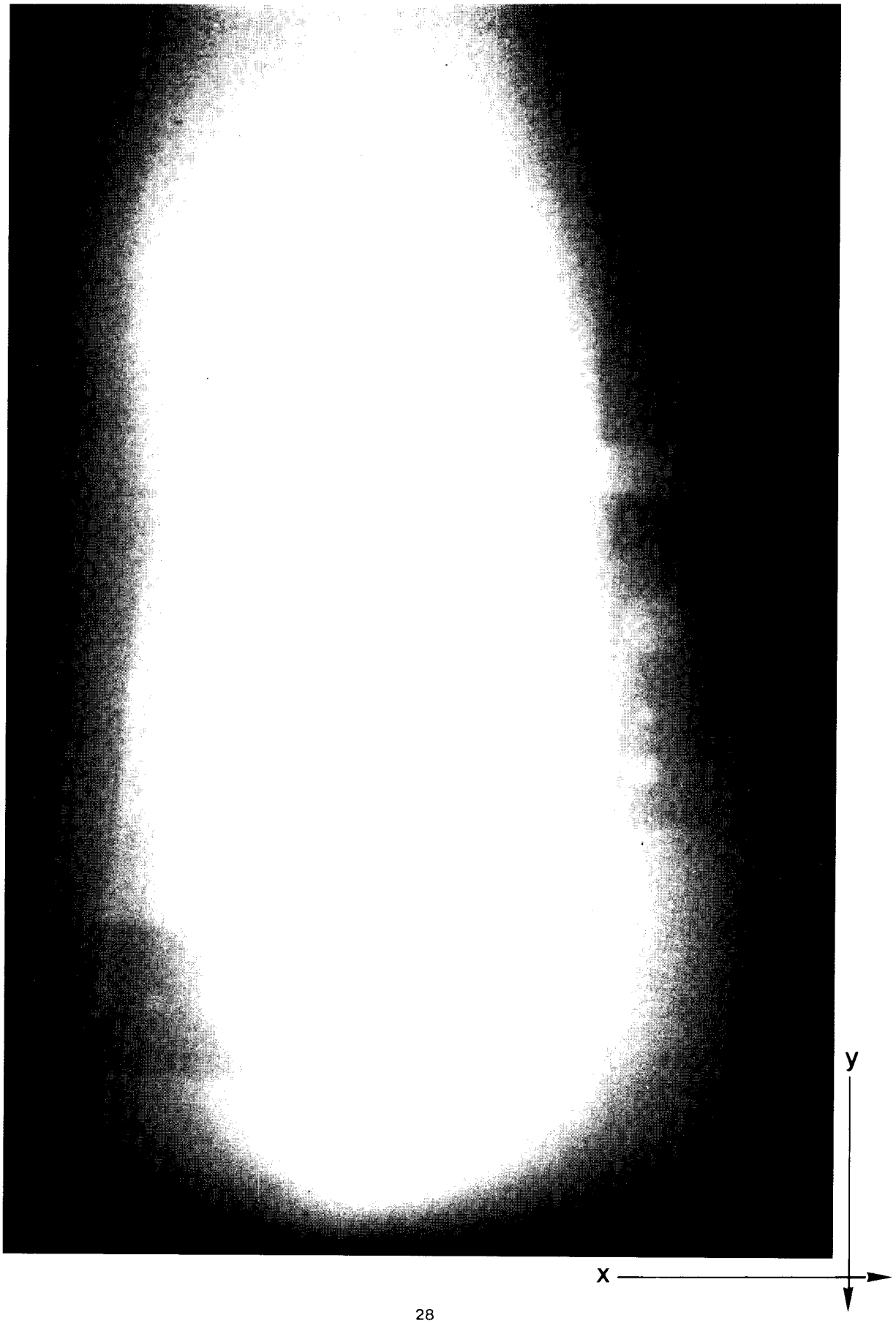


PLATE
3°
Rx
20°
10
NOZZLE
765
CENTRE LINE

Illustration of defect No. 10



PISC II PLATE 3

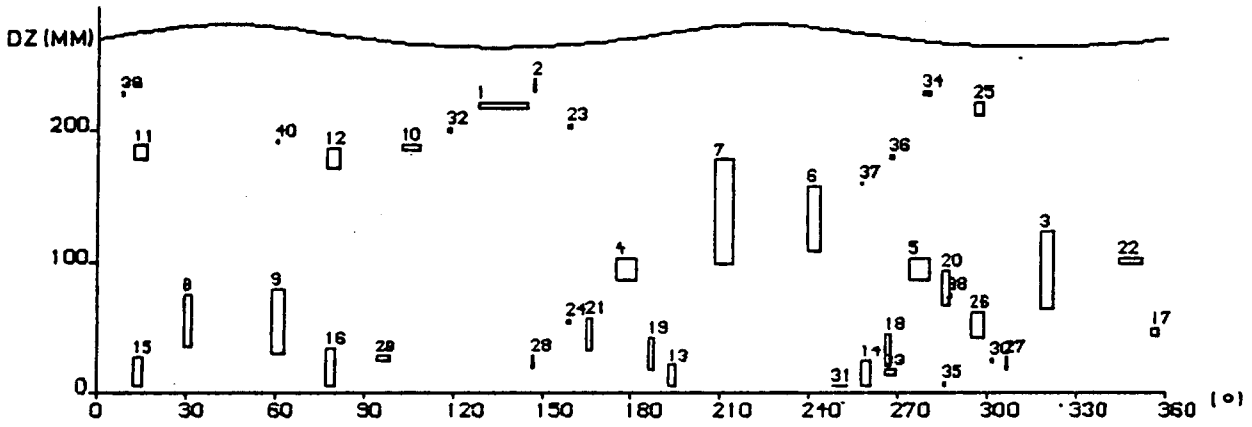
DEFECT Nr. 11

DEFECT ENVELOPE COORDINATES

X_1 = 723 mm	X_2 = 726 mm	
Y_1 = 157 mm	Y_2 = 211 mm	
Z_1 = 179 mm	Z_2 = 189 mm	

DEFECT ENVELOPE DIMENSIONS

ΔX = 3 mm	
ΔY = 54 mm	
ΔZ = 10 mm	



Defect type :
Smooth sharp planar defect with starter
Strip shape

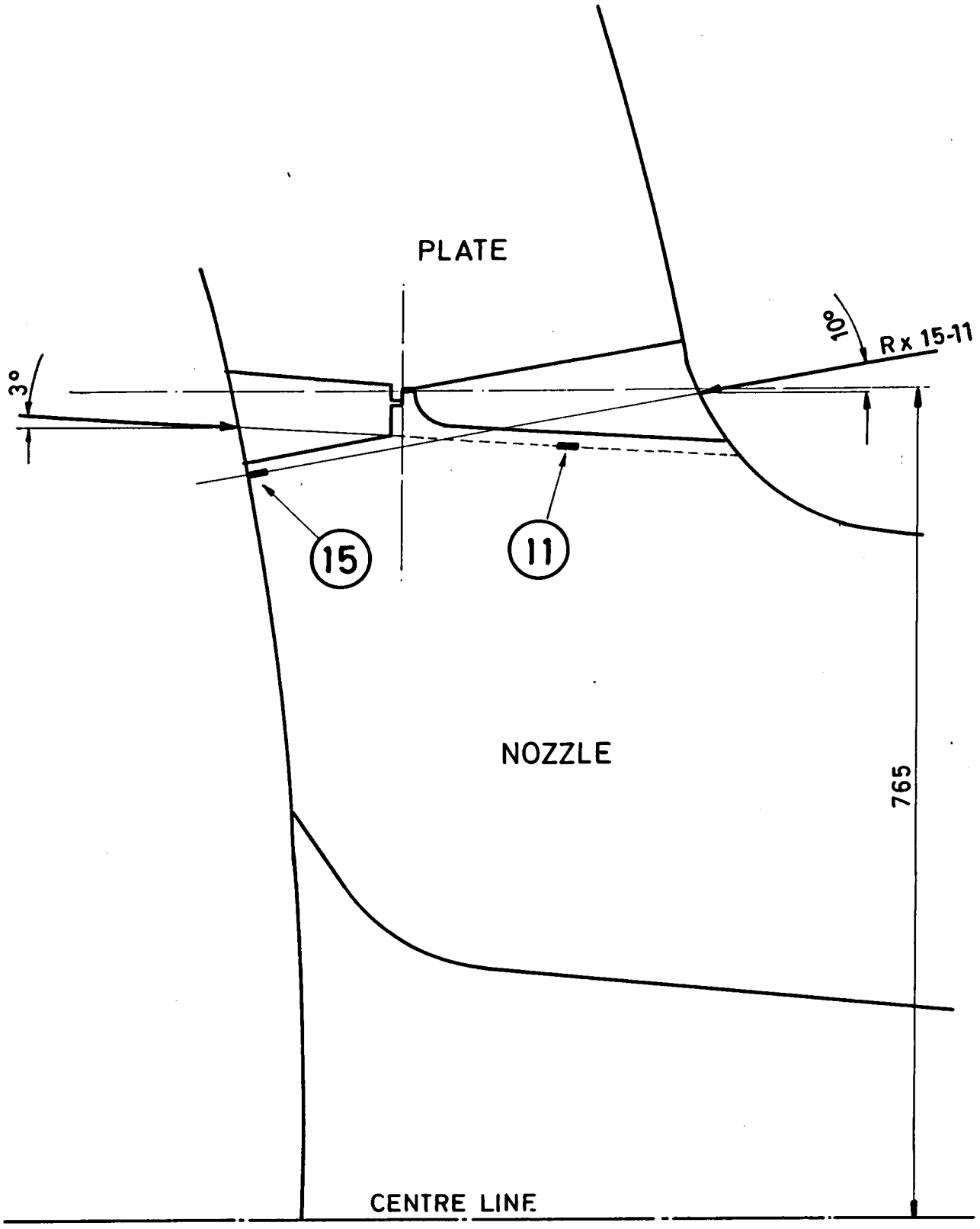
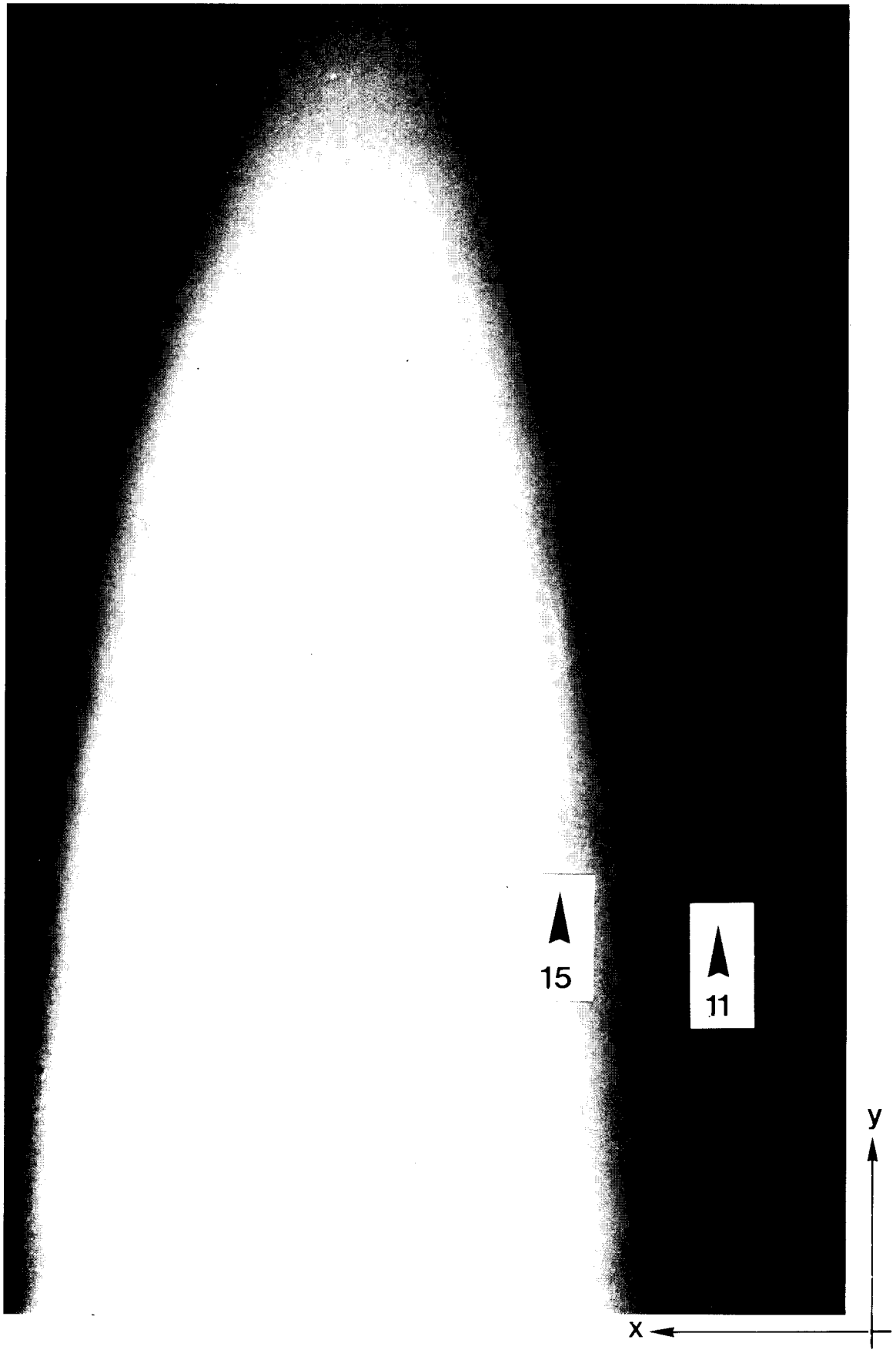


PLATE
3°
10°
R x 15-11
15
11
NOZZLE
765
CENTRE LINE

Illustration of defect No. 11



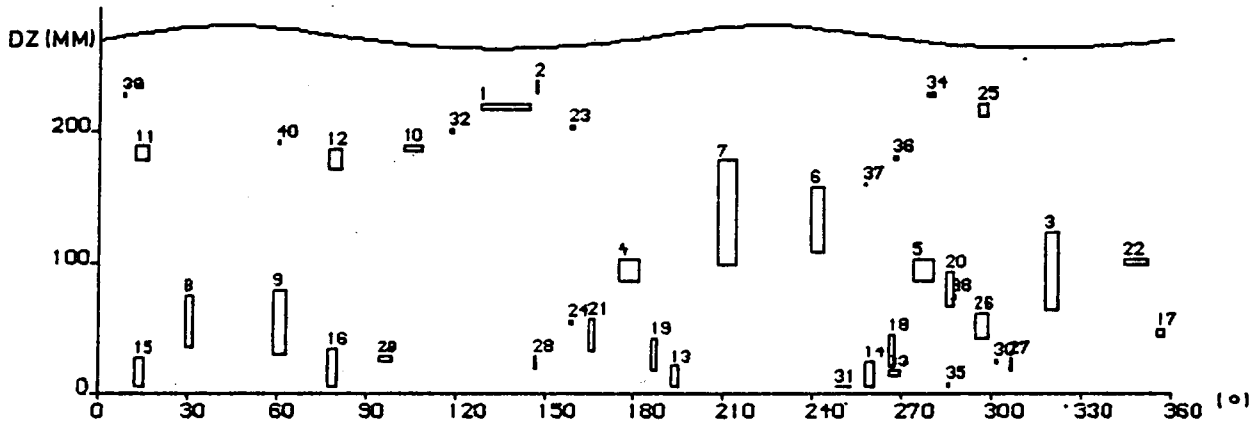
PISC II PLATE 3

DEFECT Nr. 12

DEFECT ENVELOPE COORDINATES

X_1 = 722 mm	X_2 = 727 mm	ΔX = 5 mm
Y_1 = 973 mm	Y_2 = 1028 mm	ΔY = 55 mm
Z_1 = 172 mm	Z_2 = 187 mm	ΔZ = 15 mm

DEFECT ENVELOPE DIMENSIONS



Defect type :
Planar rough defect. Strip shape

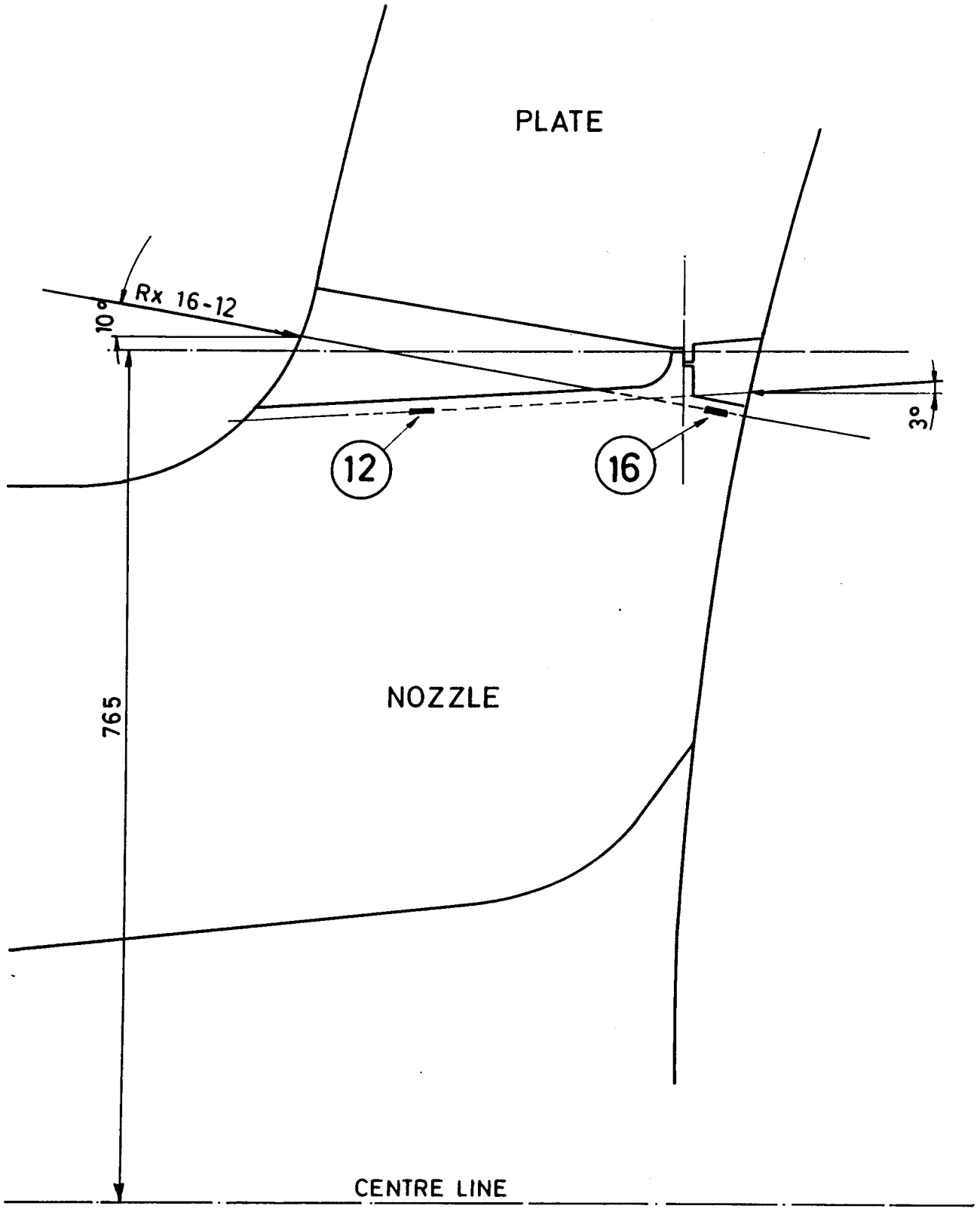
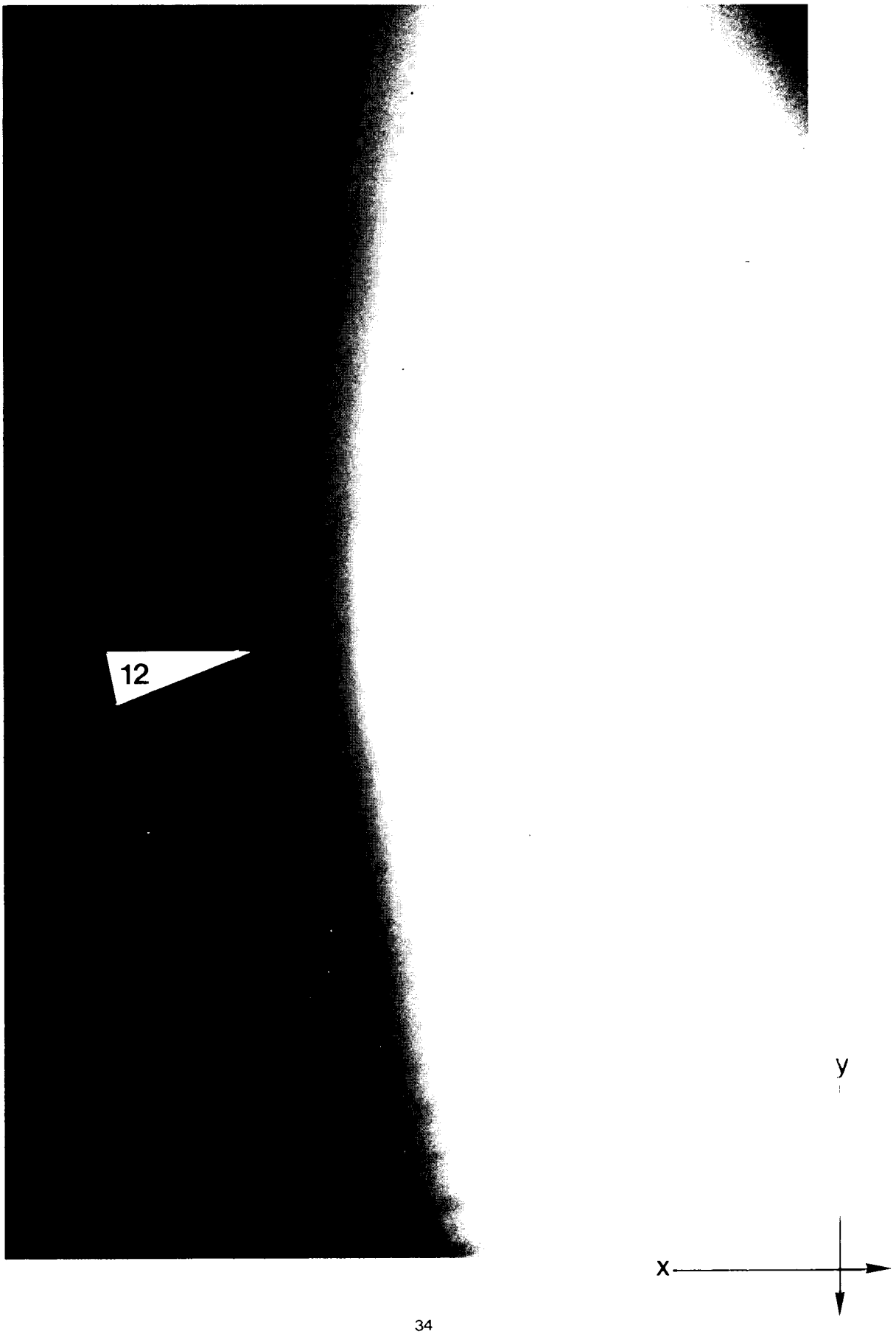


PLATE
Rx 16-12
10°
3°
12
16
765
NOZZLE
CENTRE LINE

Illustration of defect No. 12



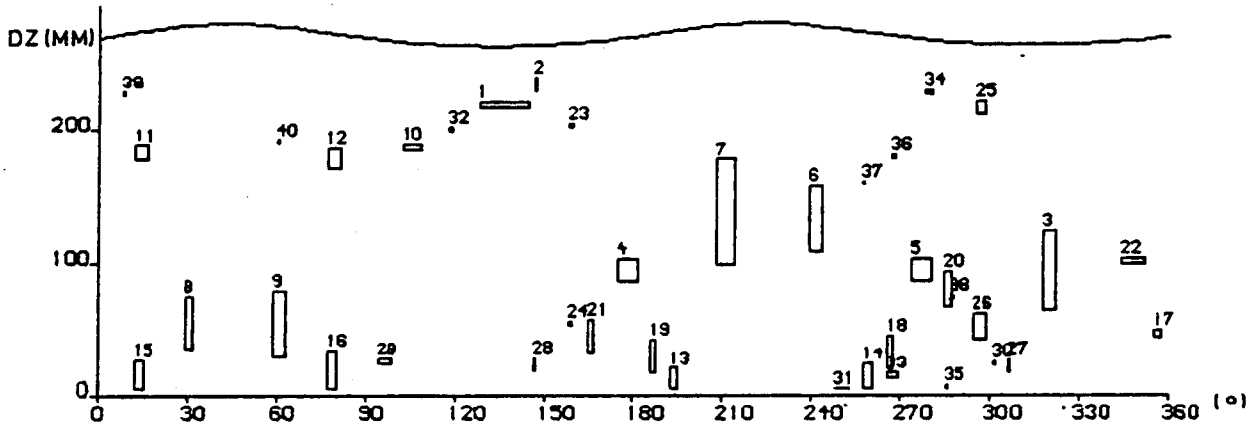
PISC II PLATE 3

DEFECT Nr. 13

DEFECT ENVELOPE COORDINATES

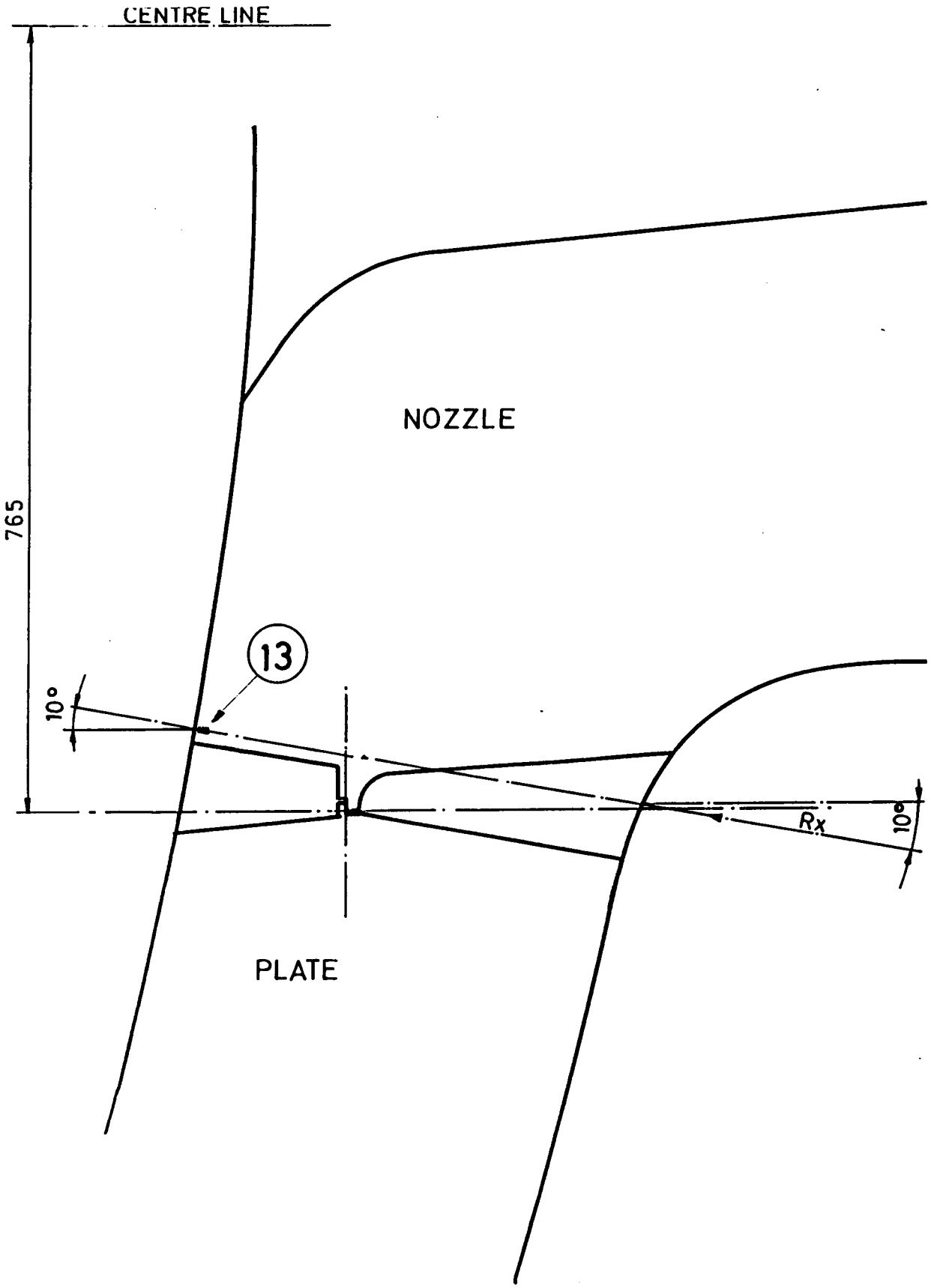
DEFECT ENVELOPE DIMENSIONS

X_1 =	722 mm	X_2 =	725 mm	ΔX =	3 mm
Y_1 =	2430 mm	Y_2 =	2456 mm	ΔY =	26 mm
Z_1 =	5 mm	Z_2 =	21 mm	ΔZ =	16 mm



Defect type :
Smooth planar sharp strip defect
Defect damaged during implanting

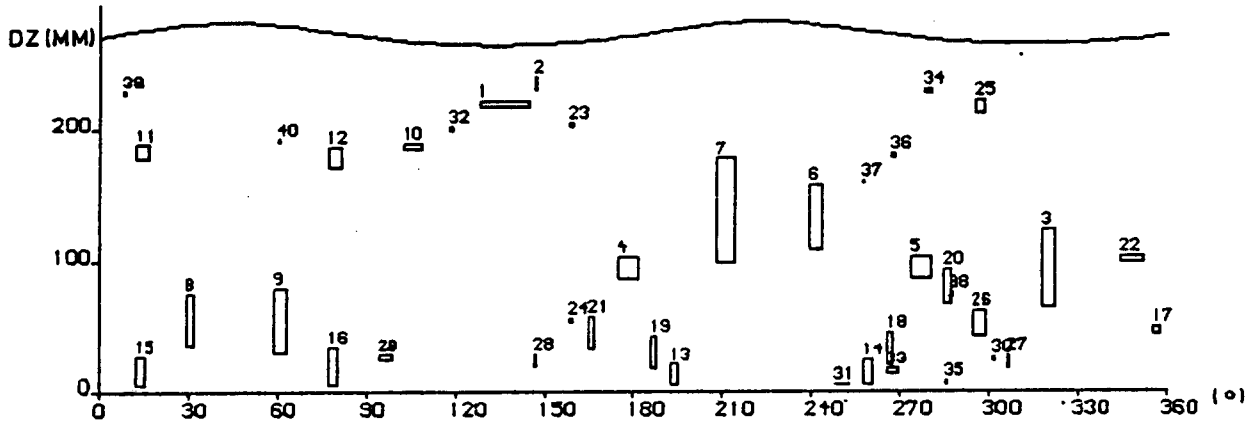
Radiograph insufficiently contrasted.
No positive available for illustration.


CENTRE LINE
765
NOZZLE
13
10°
Rx
10°
PLATE

PISC II PLATE 3 **DEFECT Nr. 14**

DEFECT ENVELOPE COORDINATES **DEFECT ENVELOPE DIMENSIONS**

X_1 =	720 mm	X_2 =	723 mm	ΔX =	3 mm
Y_1 =	3246 mm	Y_2 =	3282 mm	ΔY =	36 mm
Z_1 =	5 mm	Z_2 =	24 mm	ΔZ =	19 mm



Defect type :
Smooth sharp planar strip defect

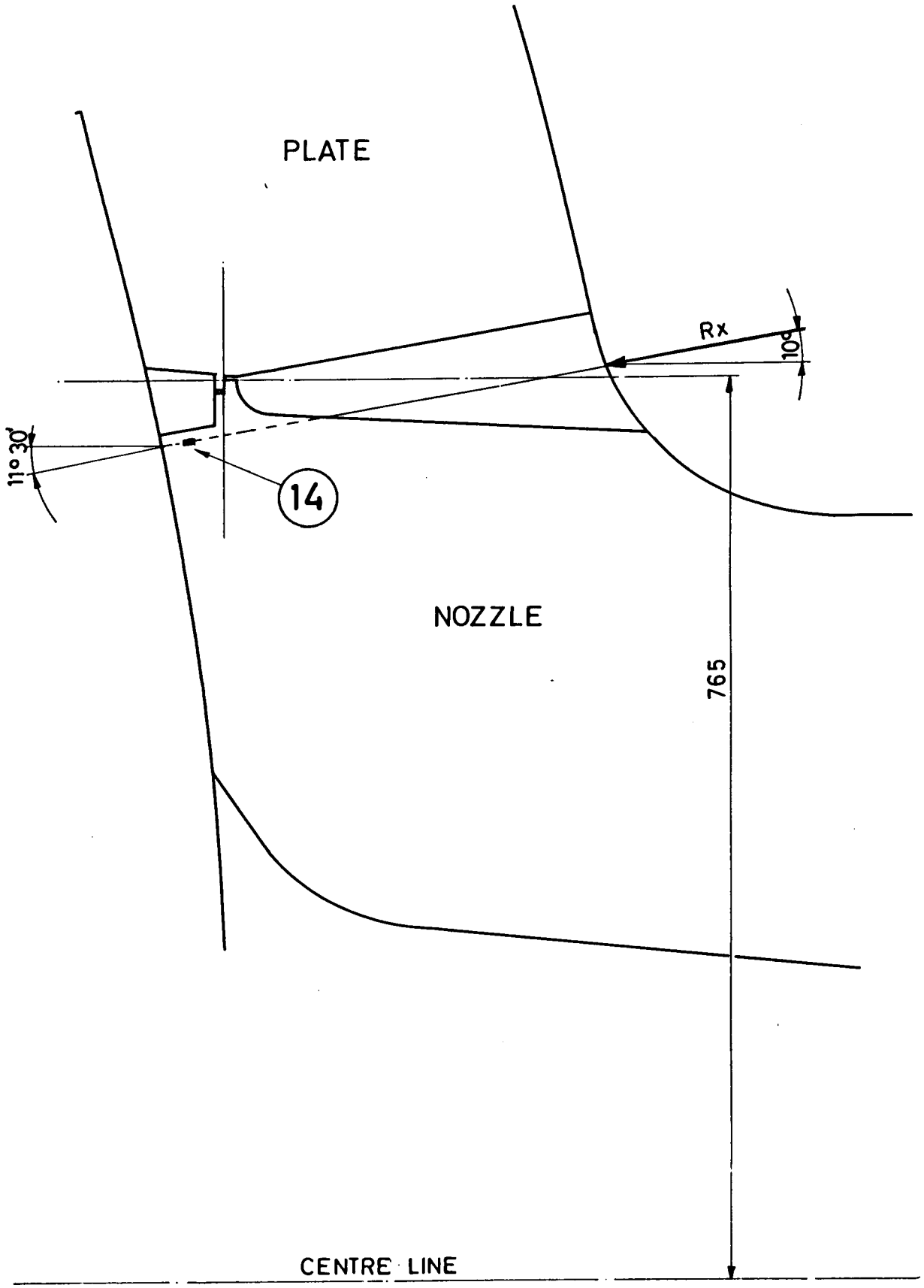
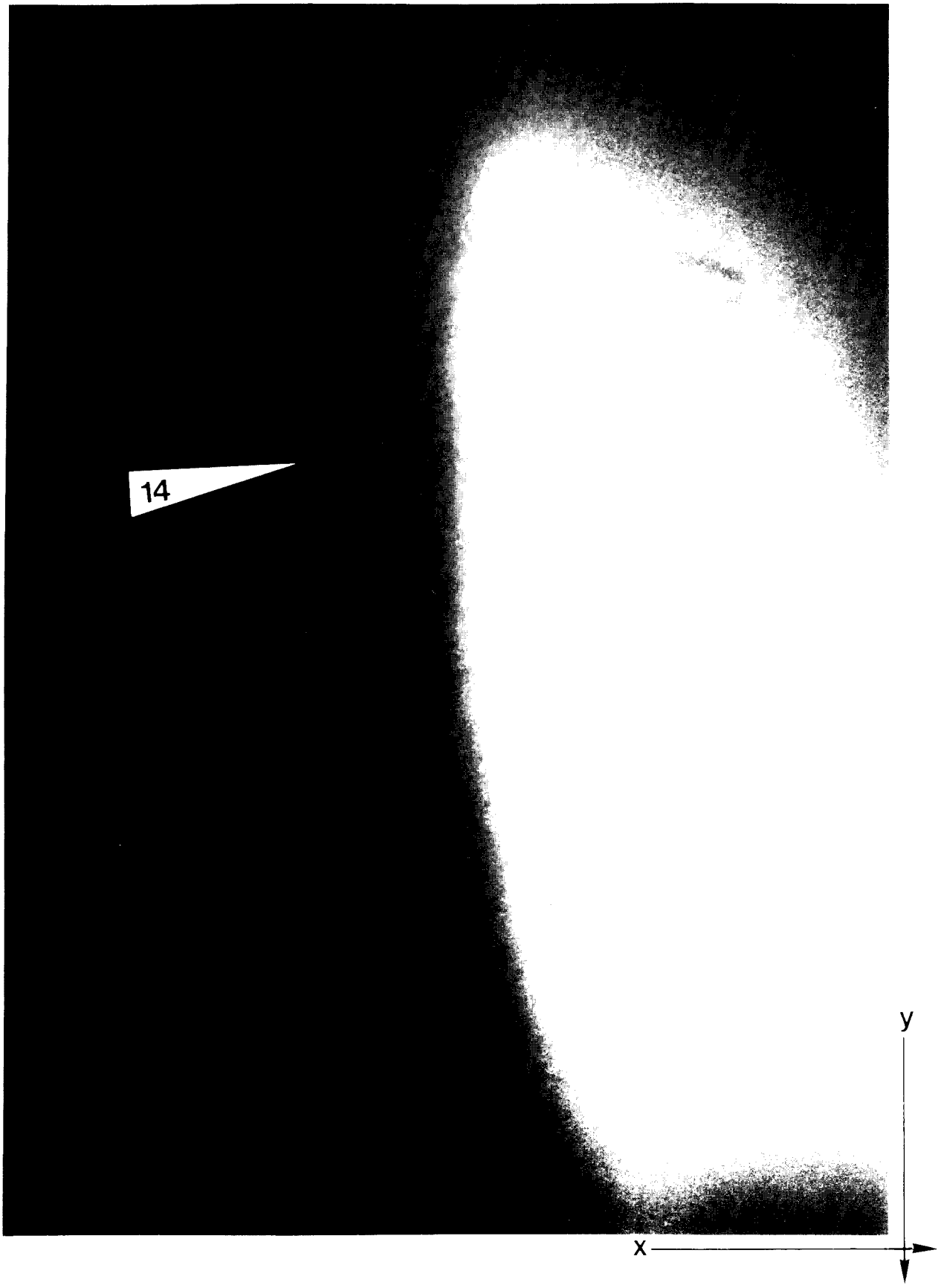


PLATE
Rx
10°
11° 30'
14
NOZZLE
765
CENTRE LINE

Illustration of defect No. 14



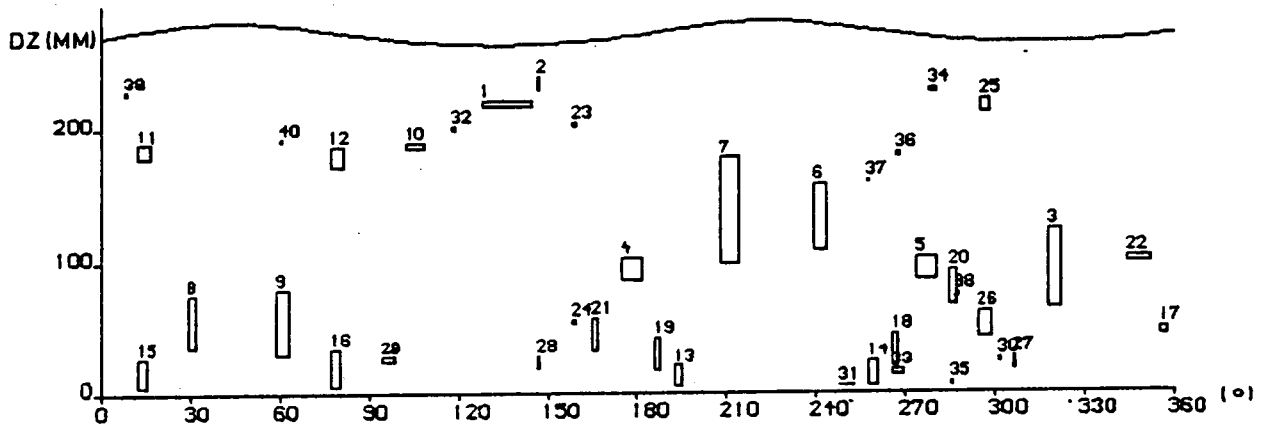
PISC II PLATE 3

DEFECT Nr. 15

DEFECT ENVELOPE COORDINATES

X_1 = 717 mm	X_2 = 719 mm	ΔX = 2 mm
Y_1 = 150 mm	Y_2 = 193 mm	ΔY = 43 mm
Z_1 = 5 mm	Z_2 = 27 mm	ΔZ = 22 mm

DEFECT ENVELOPE DIMENSIONS



Defect type:
Smooth planar sharp strip defect
Defect damaged during implanting

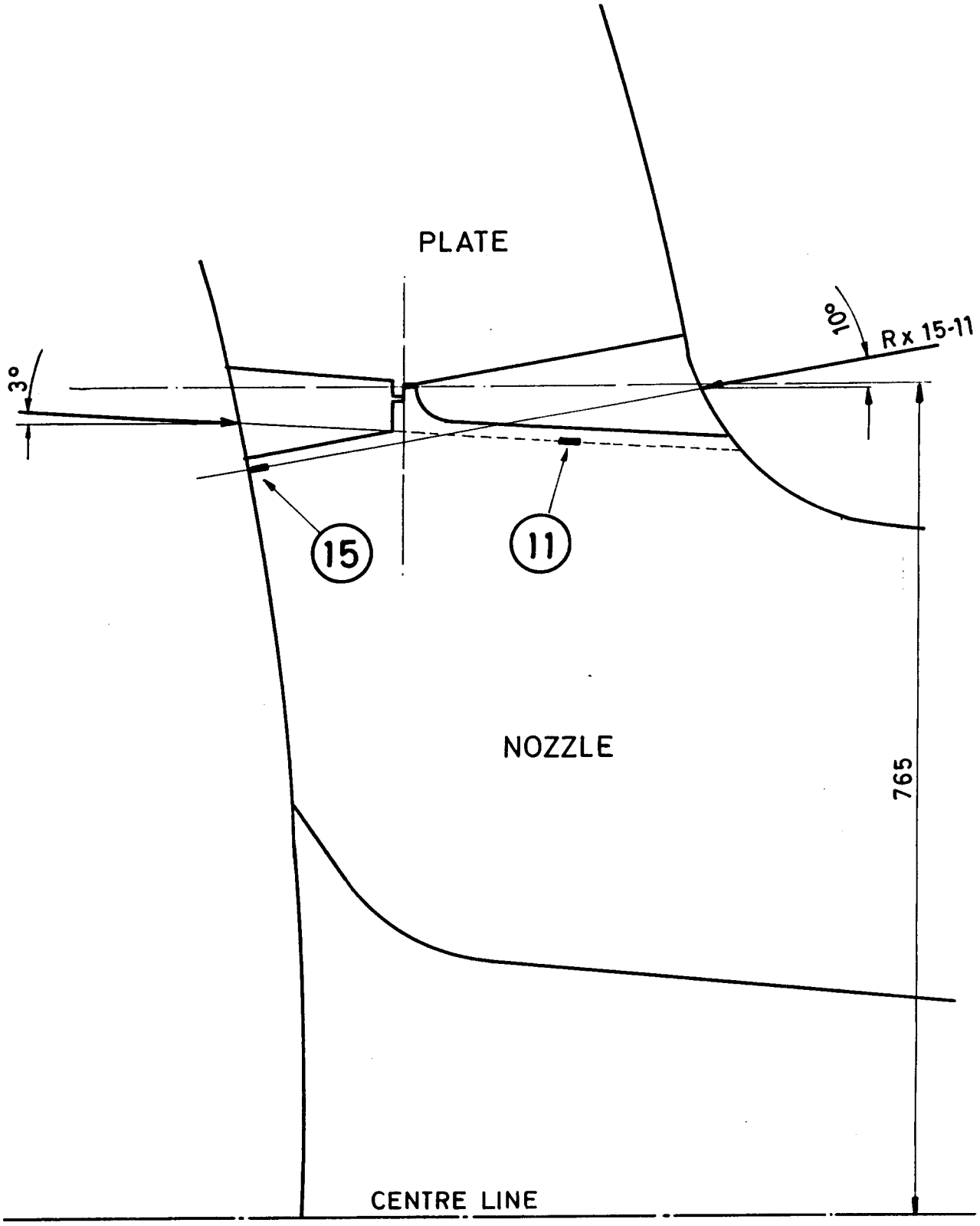
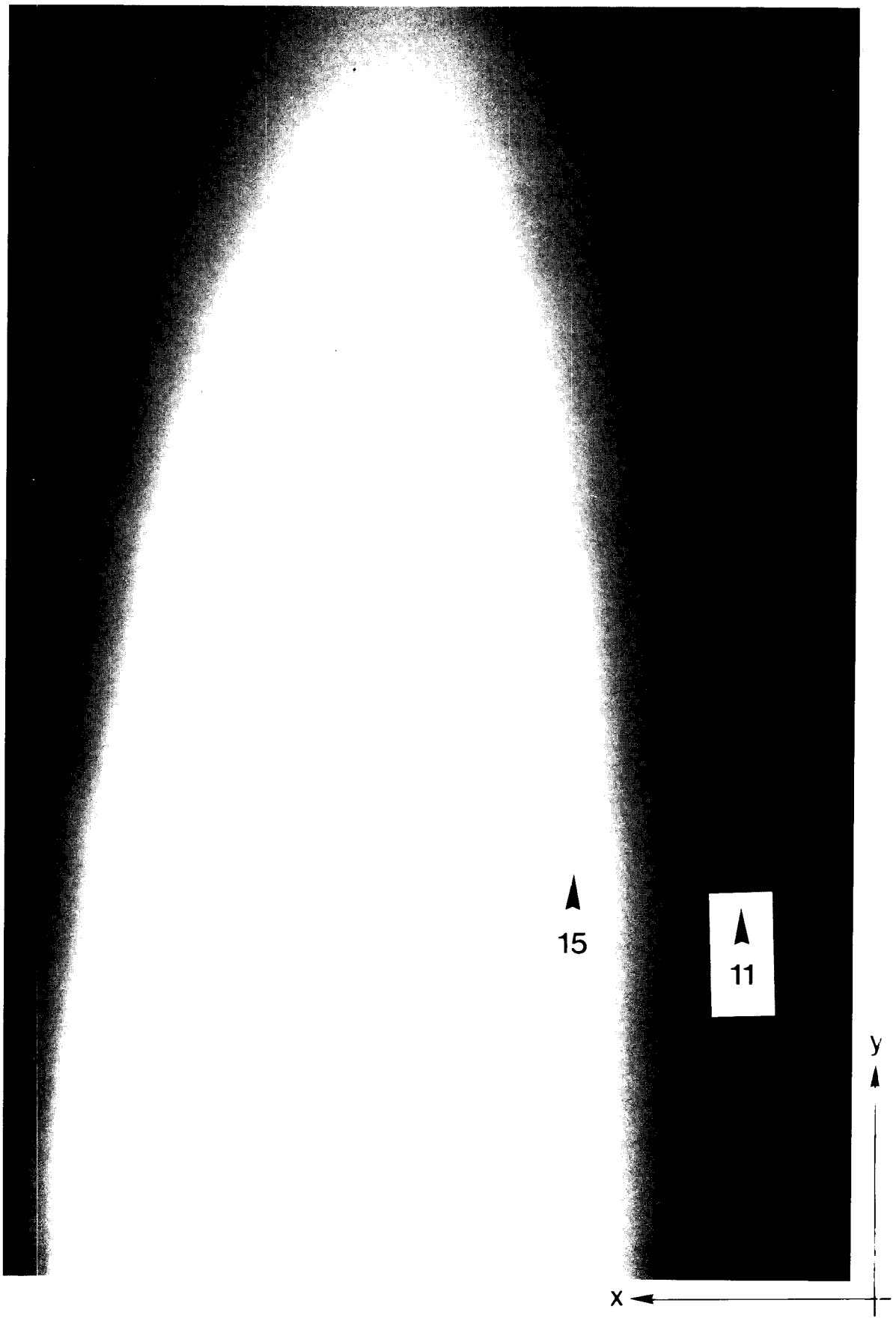


PLATE
10°
R x 15-11
3°
15
11
NOZZLE
765
CENTRE LINE

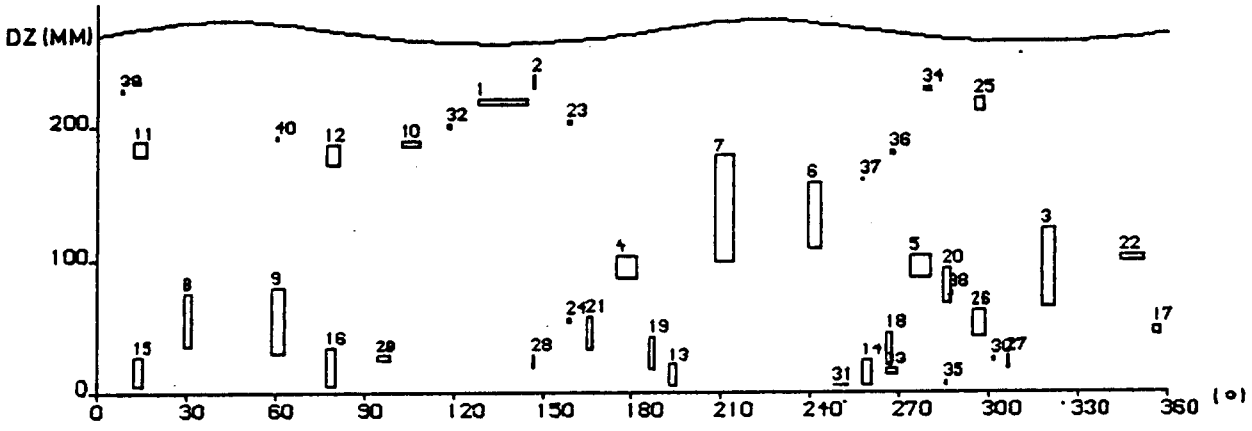
Illustration of defect No. 15



PISC II PLATE 3 **DEFECT Nr. 16**

DEFECT ENVELOPE COORDINATES **DEFECT ENVELOPE DIMENSIONS**

X_1 = 723	mm	X_2 = 728	mm	ΔX = 5	mm
Y_1 = 979	mm	Y_2 = 1020	mm	ΔY = 41	mm
Z_1 = 5	mm	Z_2 = 34	mm	ΔZ = 29	mm



Defect type :
Smooth sharp planar strip defect

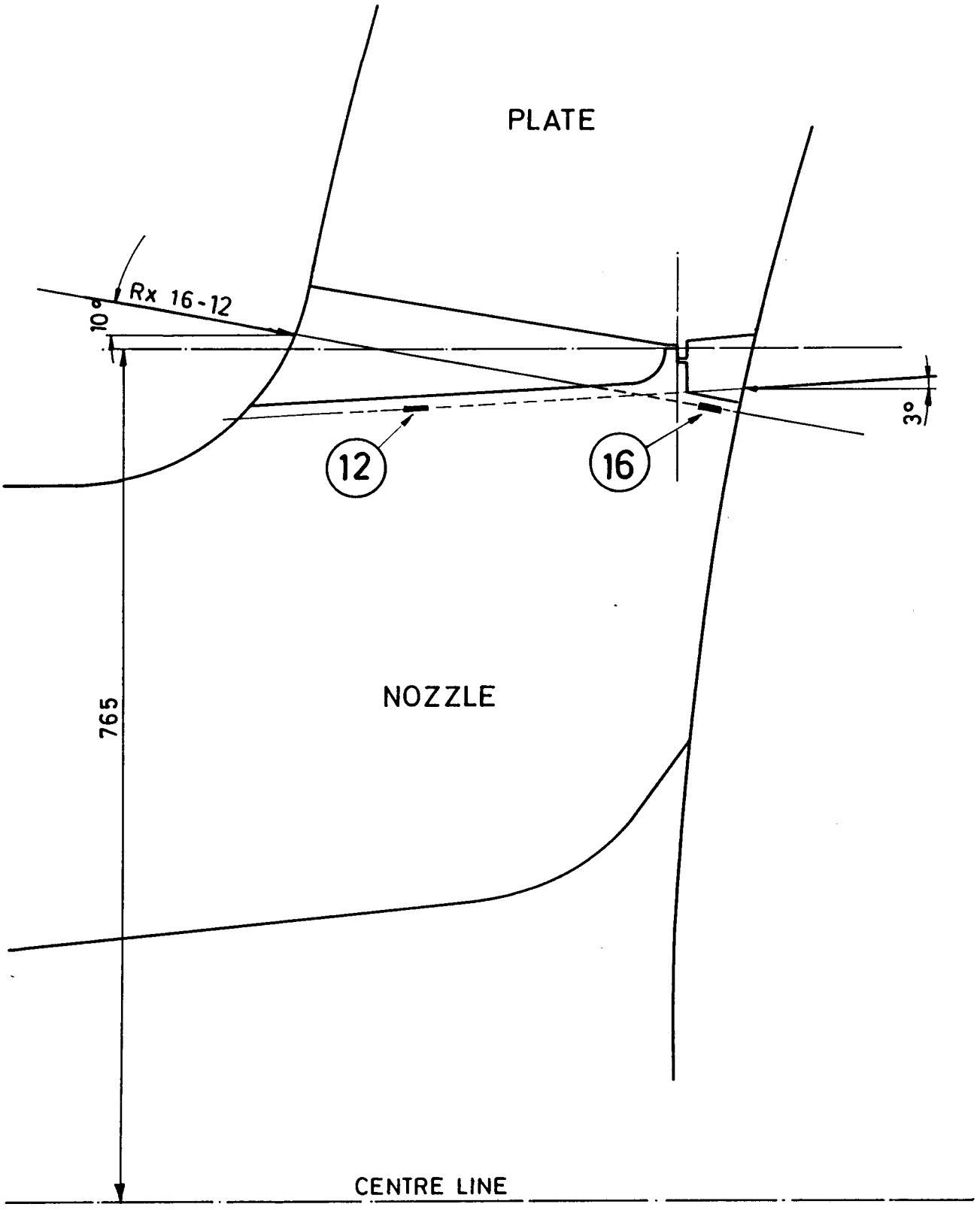
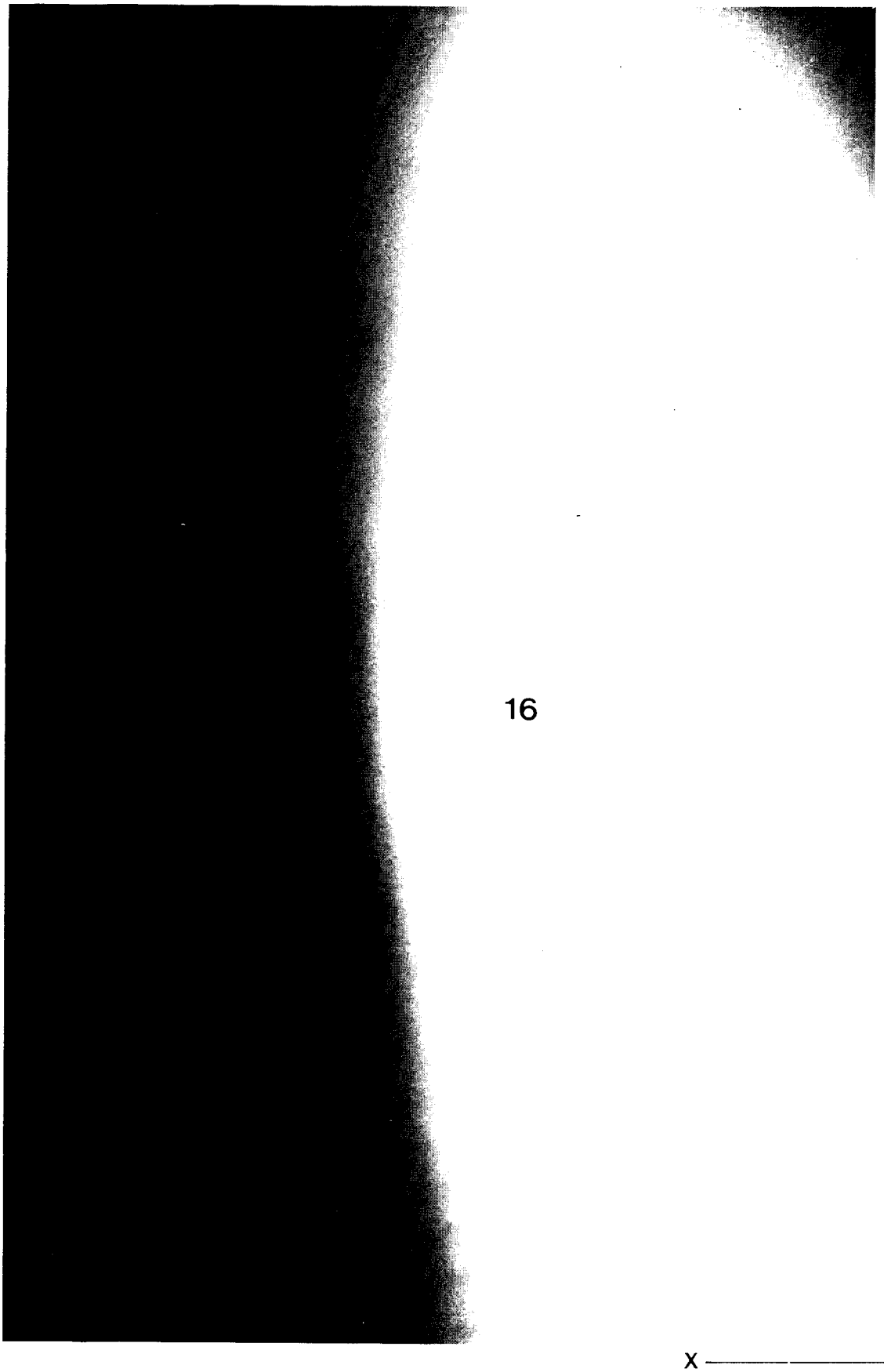


PLATE
Rx 16-12
10°
3°
12
16
765
NOZZLE
CENTRE LINE

Illustration of defect No. 16



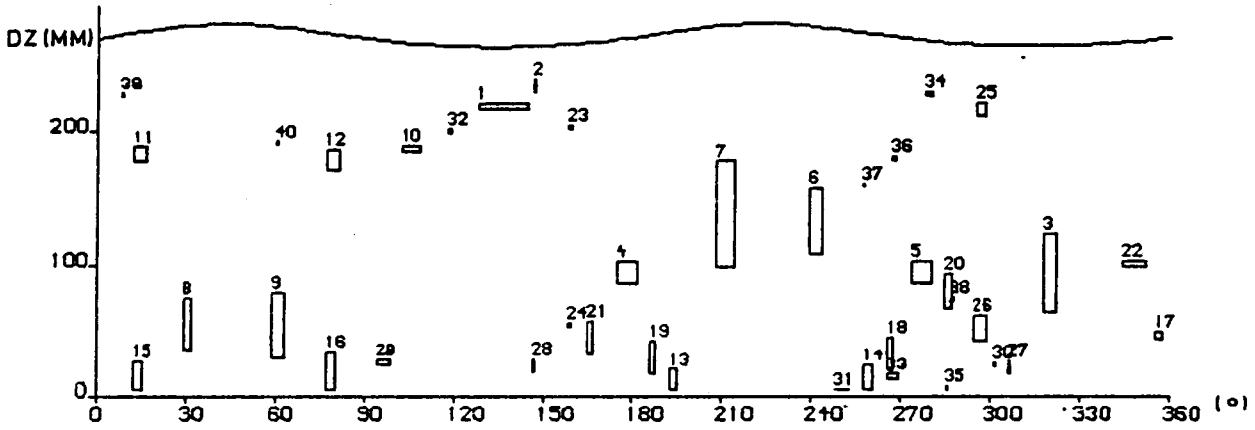
PISC II PLATE 3

DEFECT Nr. 17

DEFECT ENVELOPE COORDINATES

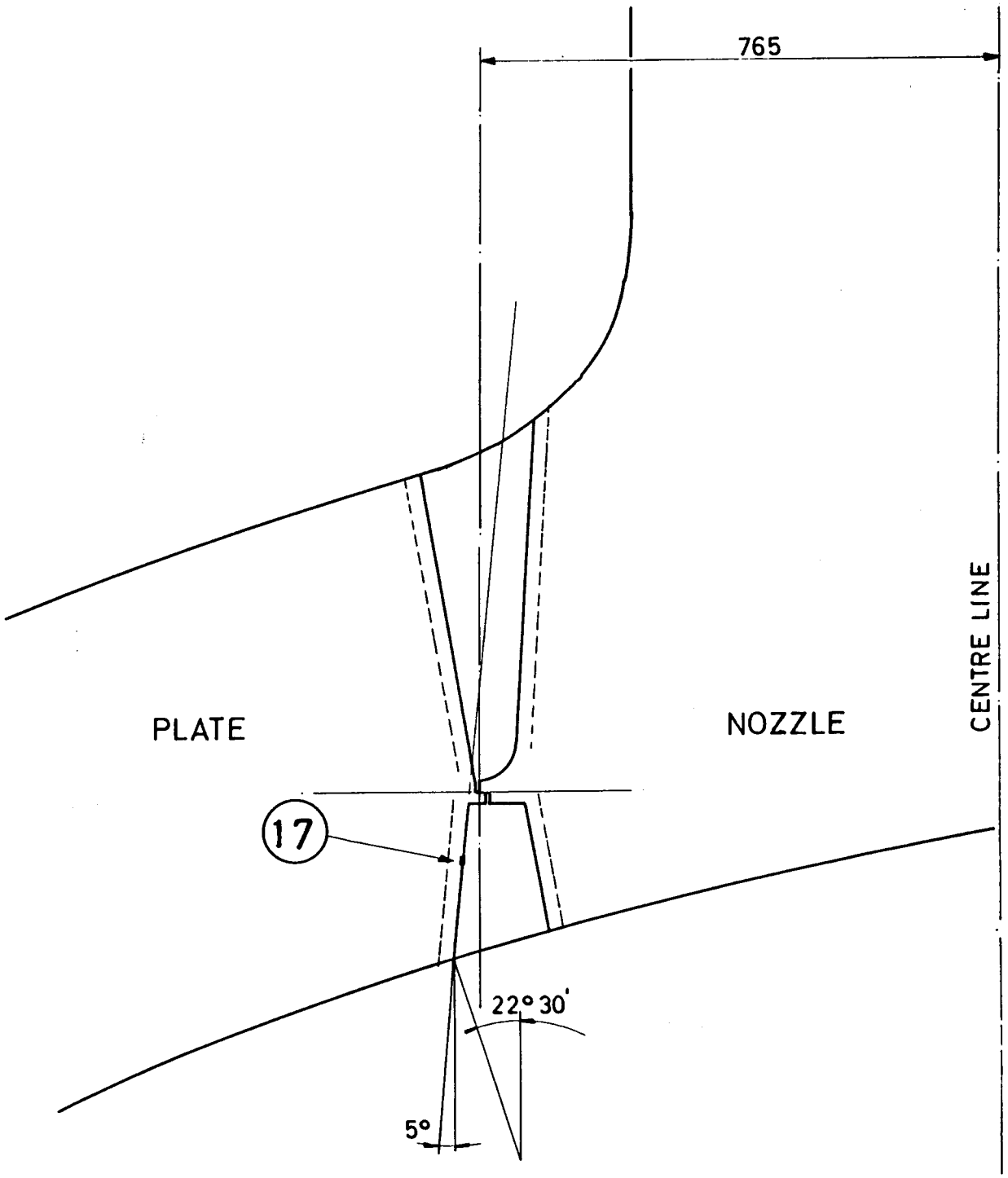
X_1 = 765 mm	X_2 = 771 mm	ΔX = 6 mm
Y_1 = 4764 mm	Y_2 = 4797 mm	ΔY = 33 mm
Z_1 = 43 mm	Z_2 = 49 mm	ΔZ = 6 mm

DEFECT ENVELOPE DIMENSIONS



Defect type :
Slag inclusion

Radiograph insufficiently contrasted.
No positive available for illustration.


765
PLATE
NOZZLE
CENTRE LINE
17
22° 30'
5°

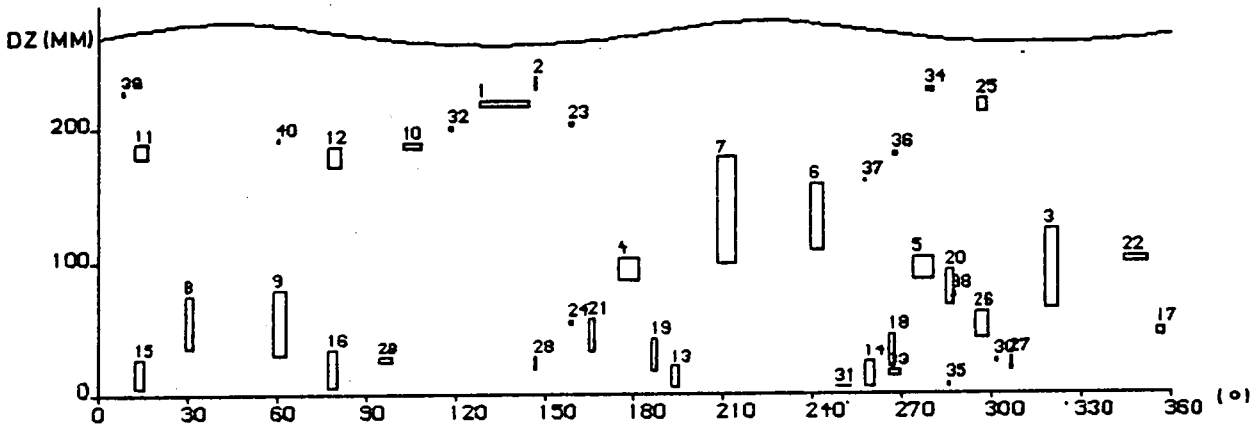
PISC II PLATE 3

DEFECT Nr. 18

DEFECT ENVELOPE COORDINATES

DEFECT ENVELOPE DIMENSIONS

X_1 =	785 mm	X_2 =	792 mm	ΔX =	7 mm
Y_1 =	3657 mm	Y_2 =	3682 mm	ΔY =	25 mm
Z_1 =	20.5 mm	Z_2 =	45.5 mm	ΔZ =	25 mm



Defect type:
Planar circular rough defect

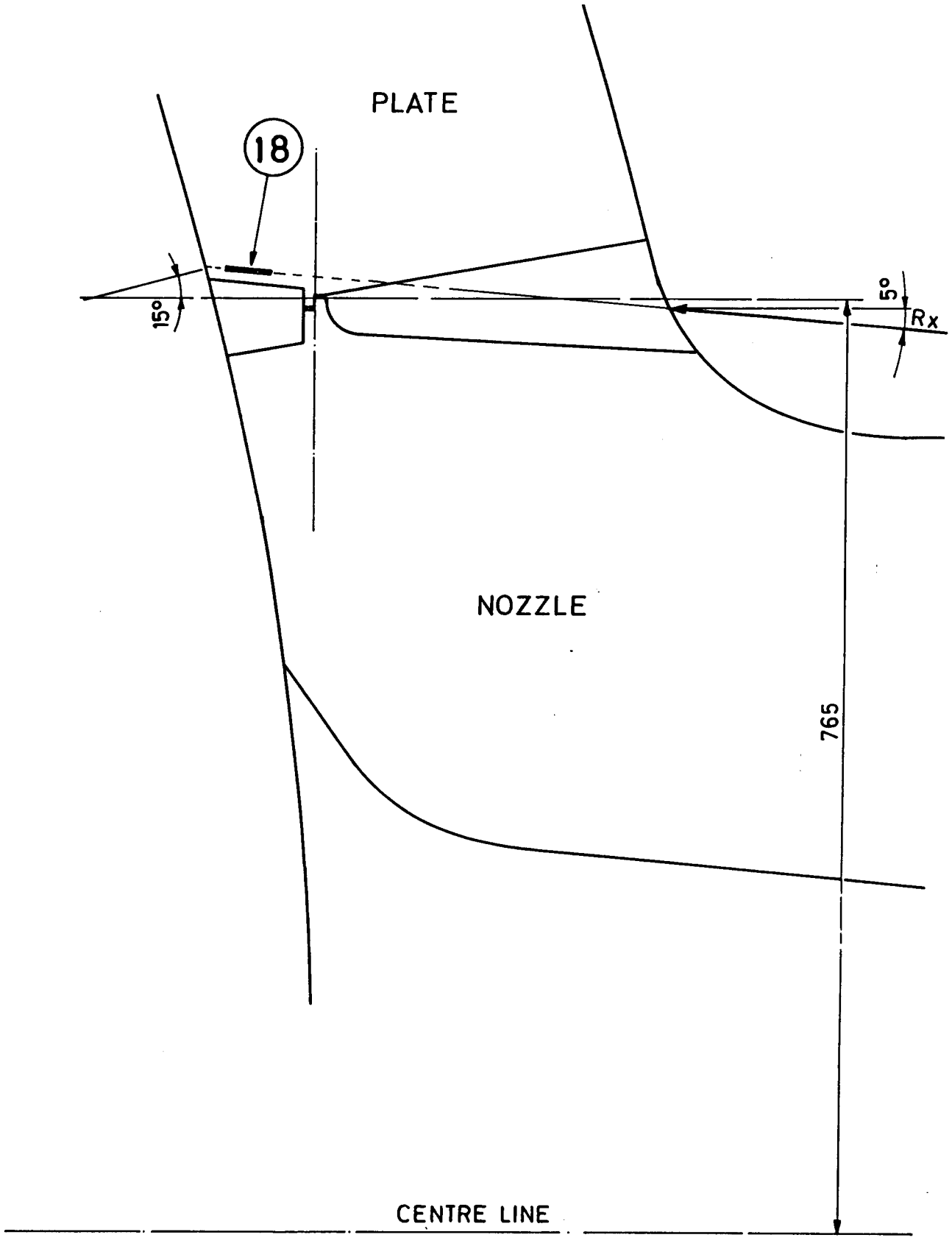
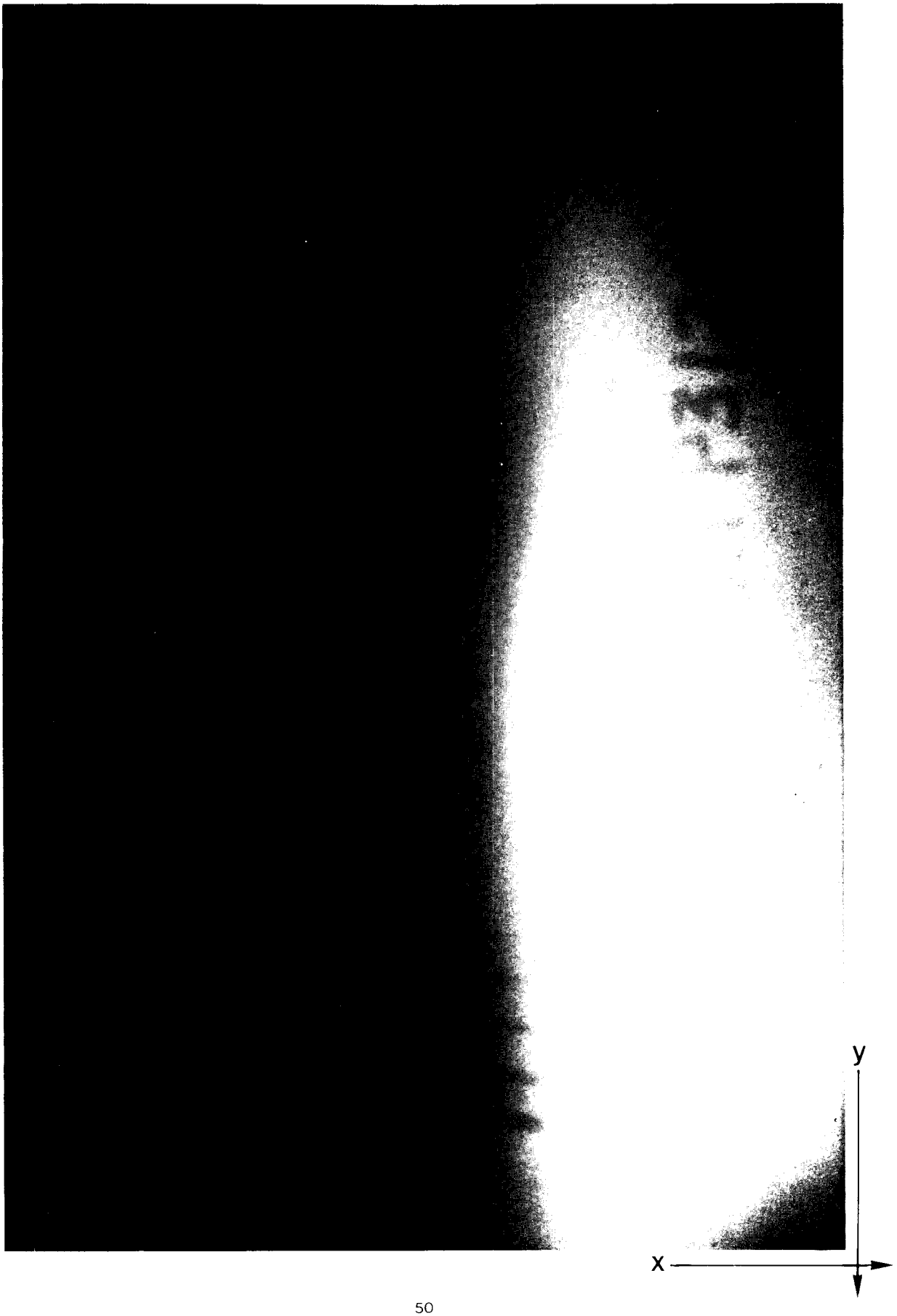


PLATE
18
15°
5°
Rx
NOZZLE
765
CENTRE LINE

Illustration of defect No. 18



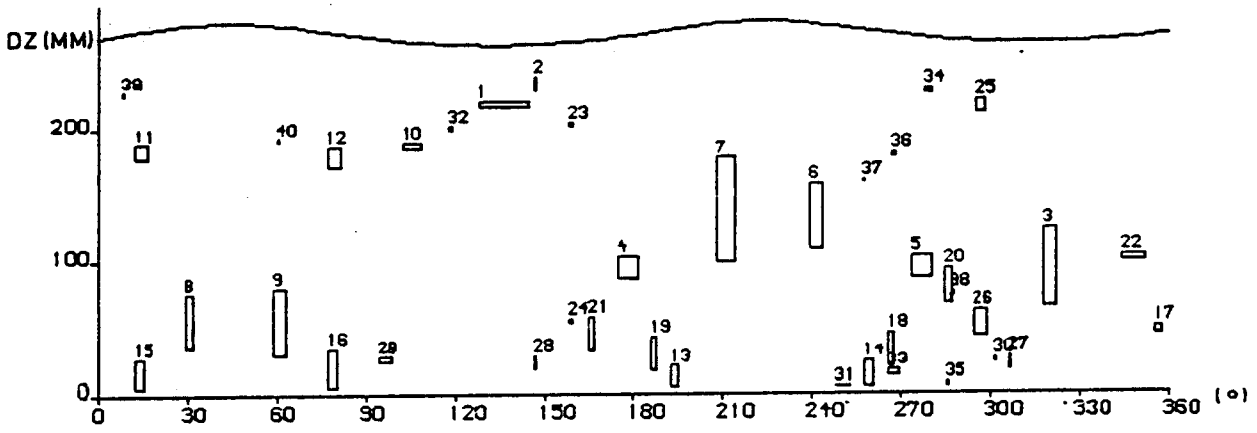
PISC II PLATE 3

DEFECT Nr. 19

DEFECT ENVELOPE COORDINATES

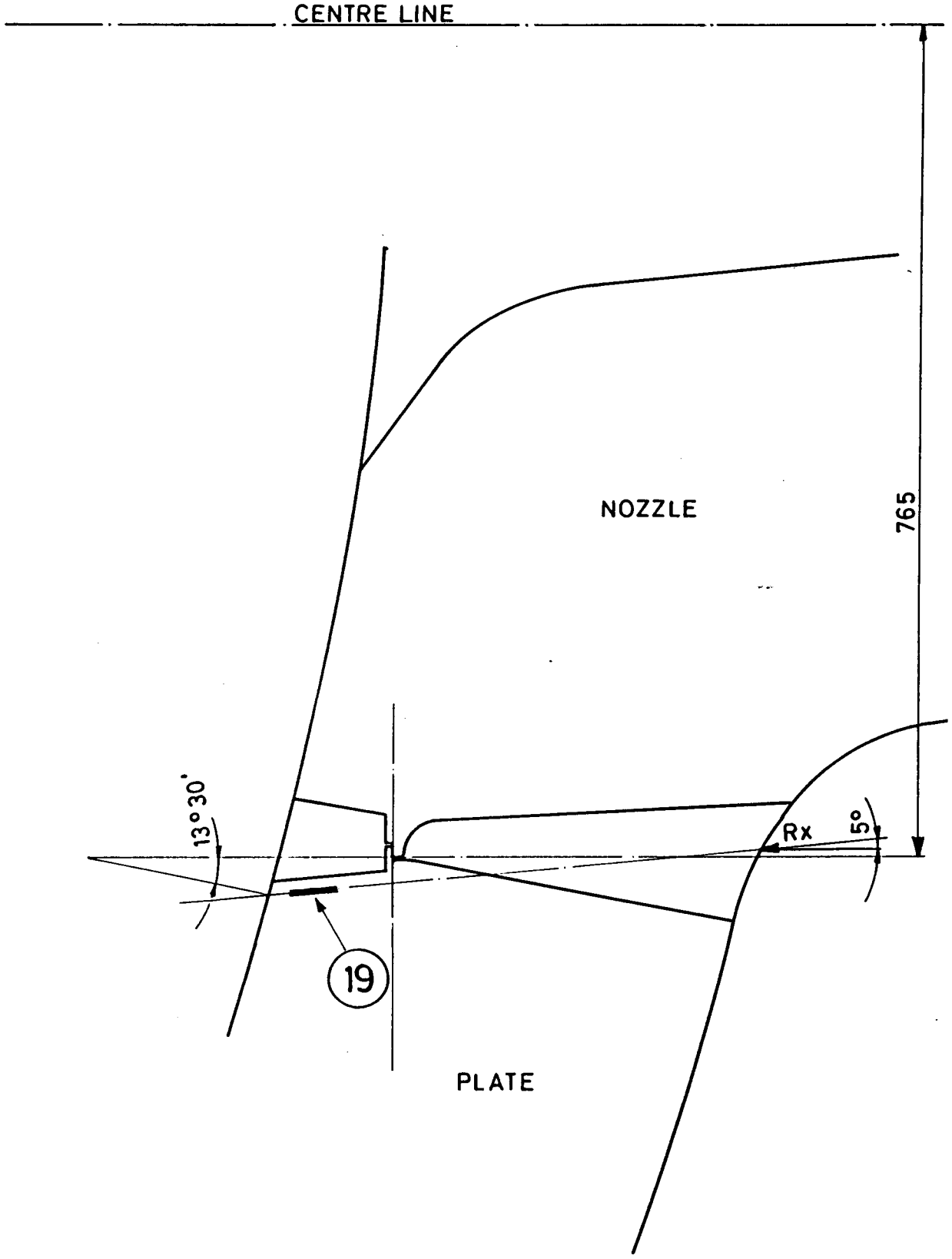
DEFECT ENVELOPE DIMENSIONS

X_1 =	785 mm	X_2 =	792 mm	ΔX =	7 mm
Y_1 =	2557 mm	Y_2 =	2582 mm	ΔY =	25 mm
Z_1 =	17.5 mm	Z_2 =	42.5 mm	ΔZ =	25 mm



Defect type :
Planar smooth sharp circular defect

Radiograph insufficiently contrasted.
No positive available for illustration.

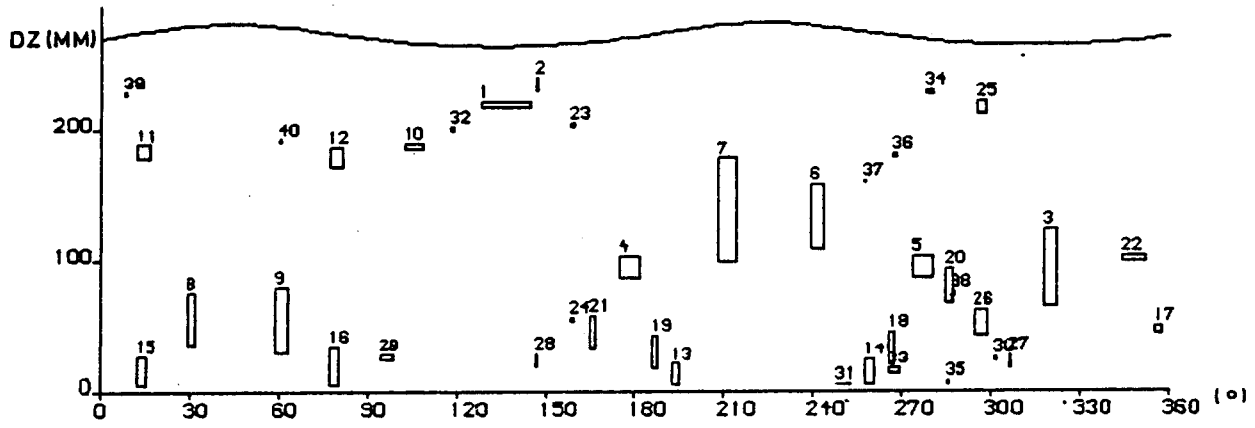

CENTRE LINE
NOZZLE
765
13°30'
Rx
5°
19
PLATE

DEFECT ENVELOPE COORDINATES

X_1 = 775 mm	X_2 = 782 mm	
Y_1 = 3869 mm	Y_2 = 3895 mm	
Z_1 = 67 mm	Z_2 = 93 mm	

DEFECT ENVELOPE DIMENSIONS

ΔX = 7 mm	
ΔY = 26 mm	
ΔZ = 26 mm	



Defect type:
Planar rough defect; circular sharpe

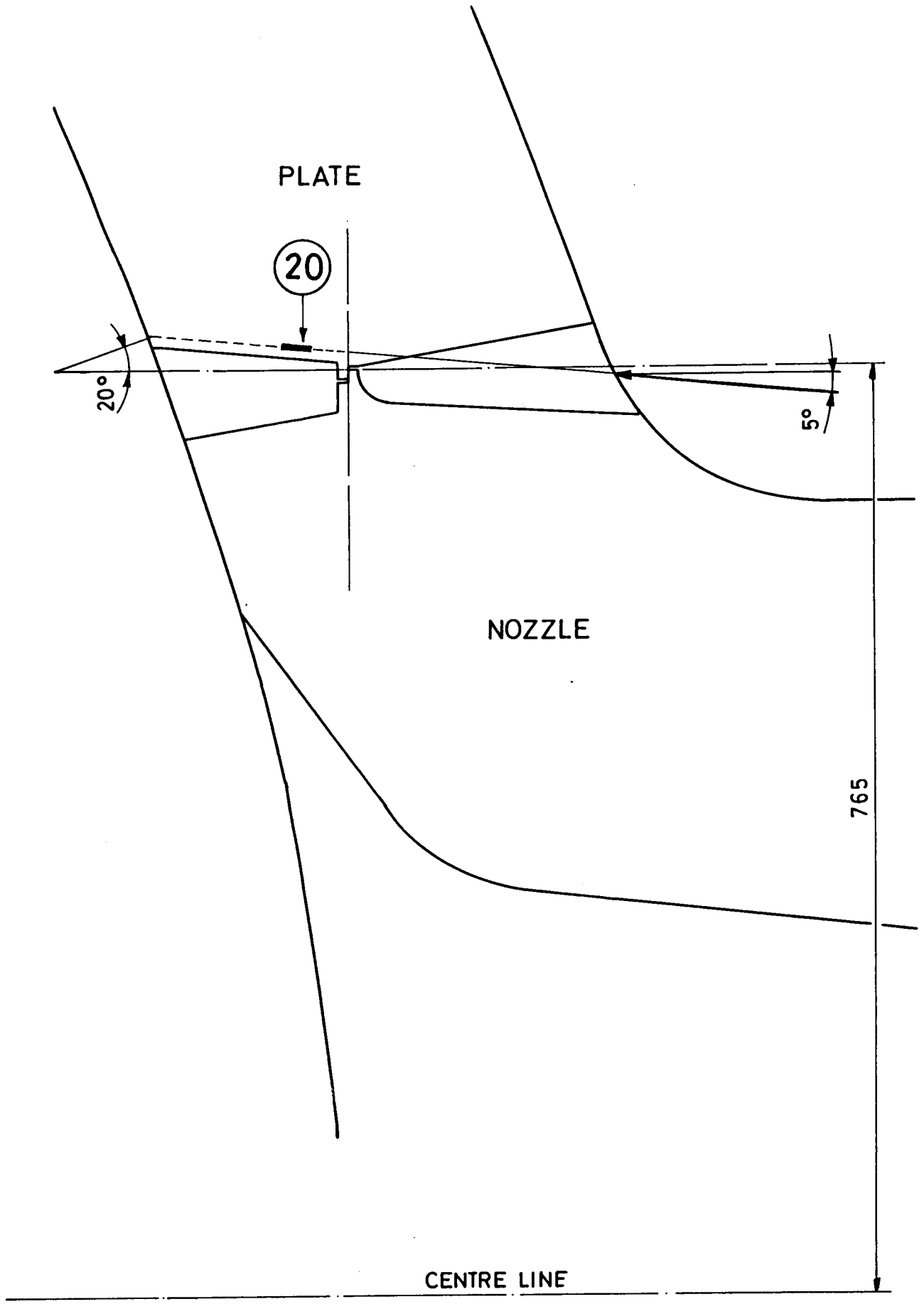
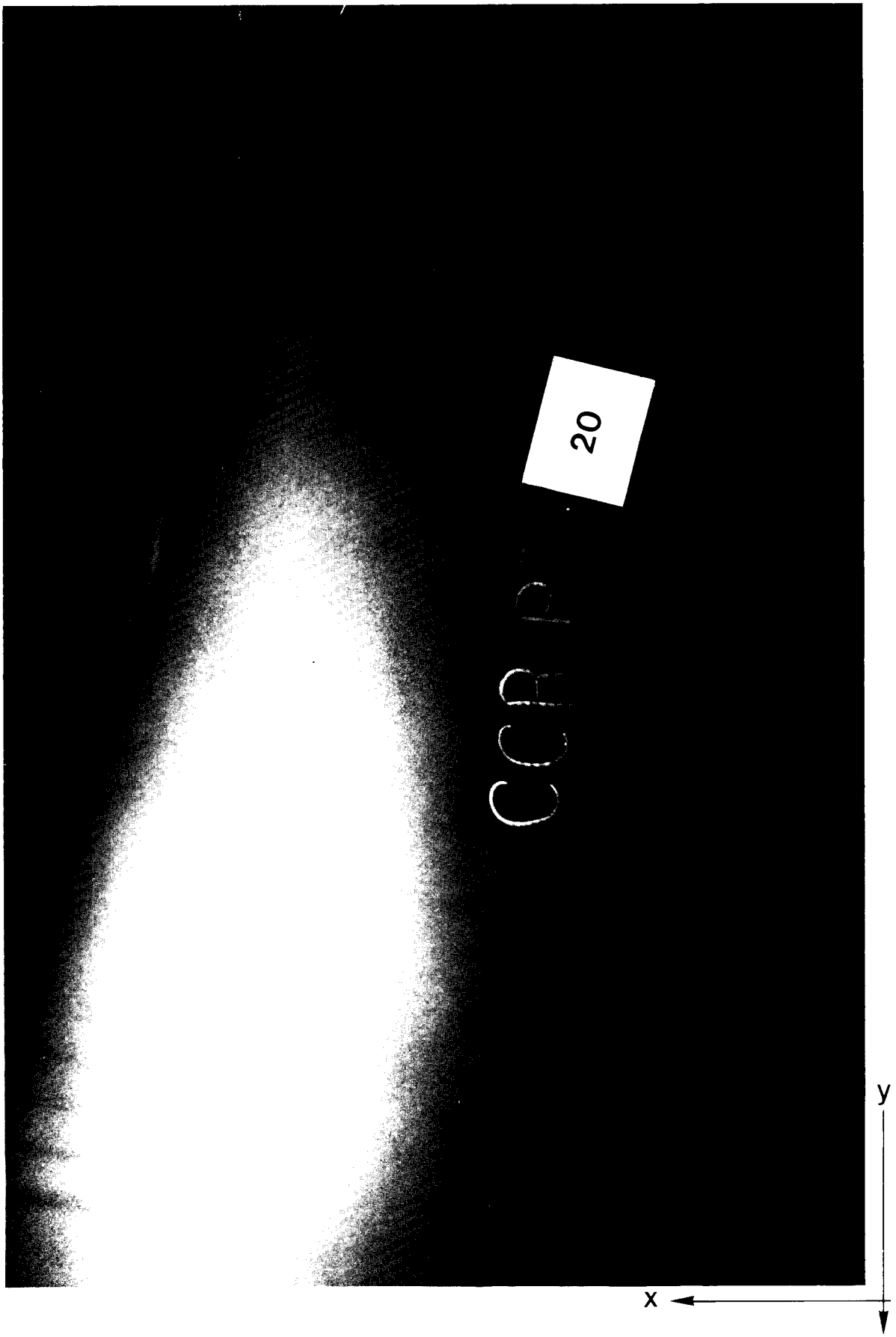


PLATE
20
20°
5°
NOZZLE
765
CENTRE LINE

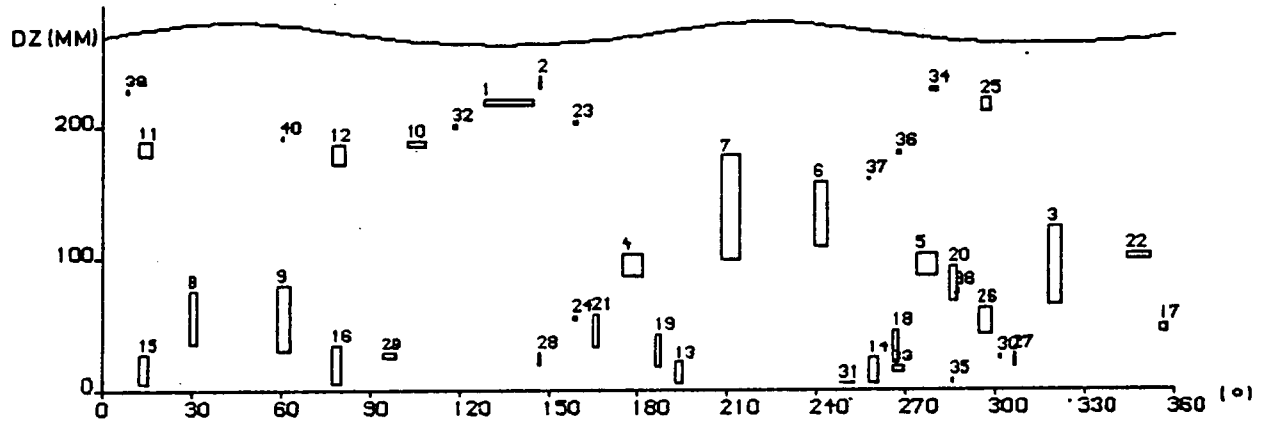
Illustration of defect No. 20



DEFECT ENVELOPE COORDINATES

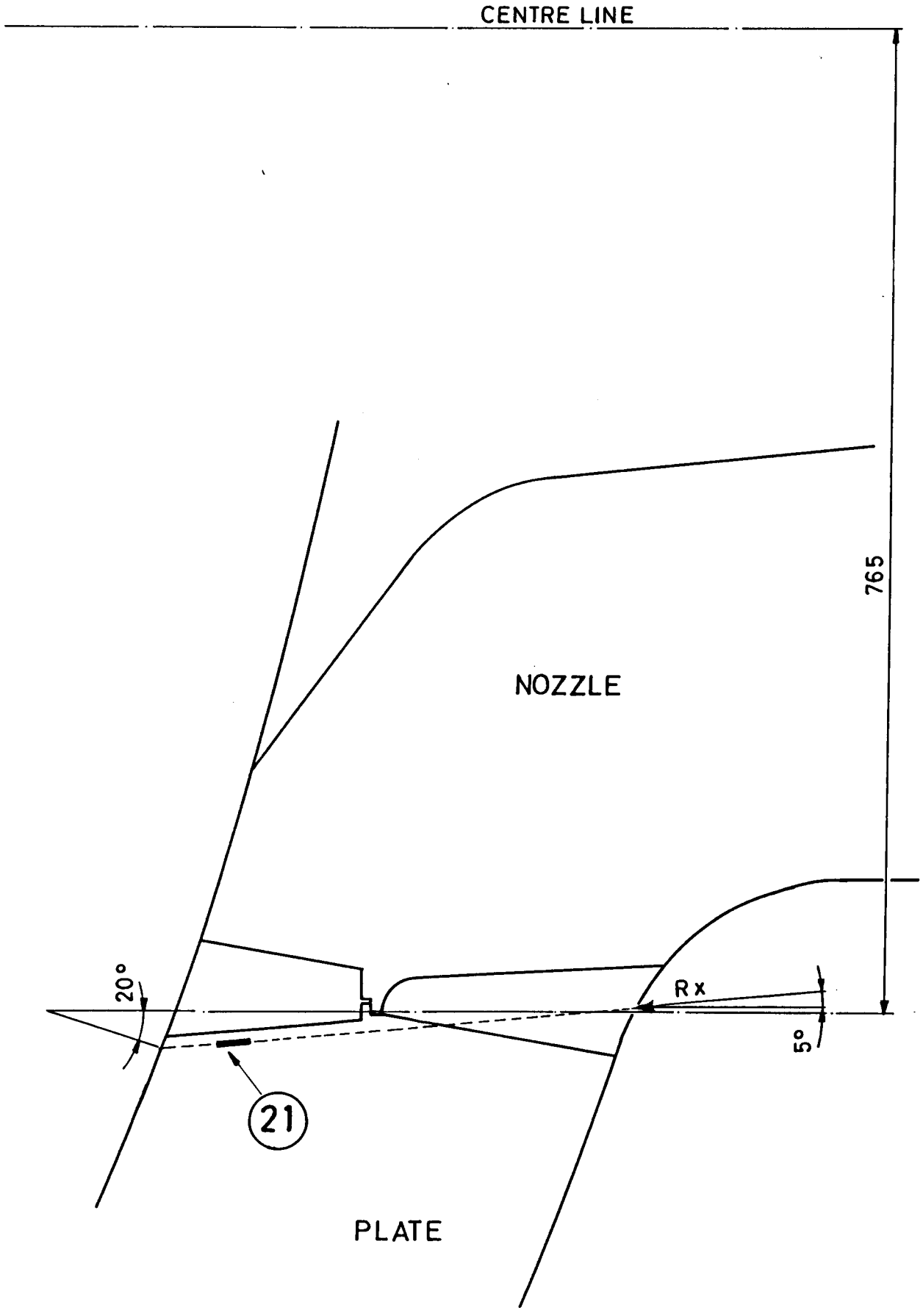
X_1 = 782 mm	X_2 = 785 mm	ΔX = 3 mm
Y_1 = 2255 mm	Y_2 = 2281 mm	ΔY = 26 mm
Z_1 = 32 mm	Z_2 = 58 mm	ΔZ = 26 mm

DEFECT ENVELOPE DIMENSIONS



Defect type;
Smooth Sharp planar circular defect

Radiograph insufficiently contrasted.
No positive available for illustration.


CENTRE LINE
765
NOZZLE
20°
Rx
5°
21
PLATE

PISC II PLATE 3 DEFECT Nr. 22

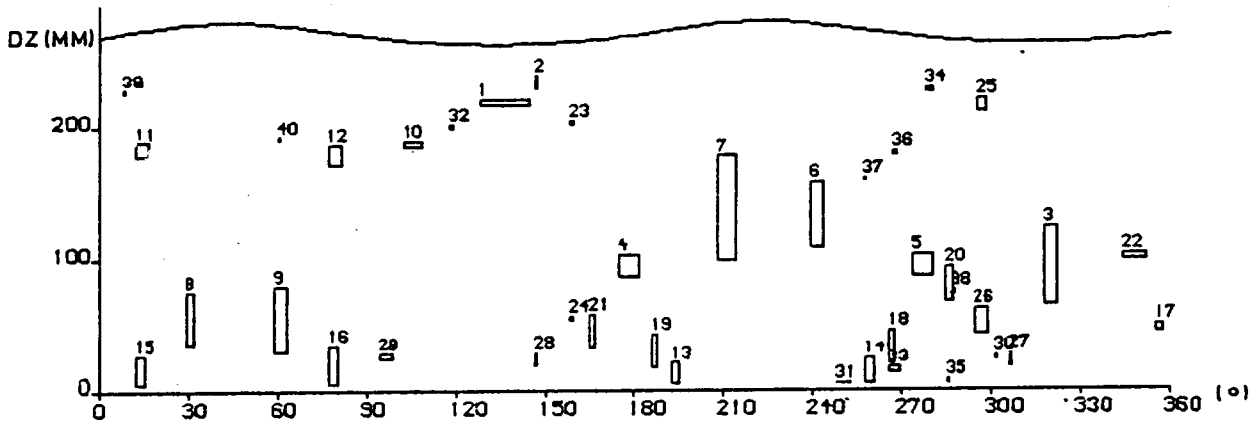
DEFECT ENVELOPE COORDINATES

X_1 = 730 mm
Y_1 = 4396 mm
Z_1 = 98 mm

X_2 = 735 mm
Y_2 = 4499 mm
Z_2 = 103 mm

DEFECT ENVELOPE DIMENSIONS

ΔX = 5 mm
ΔY = 103 mm
ΔZ = 5 mm



Defect type :
Long slag inclusions

Radiograph insufficiently contrasted.
No positive available for illustration.

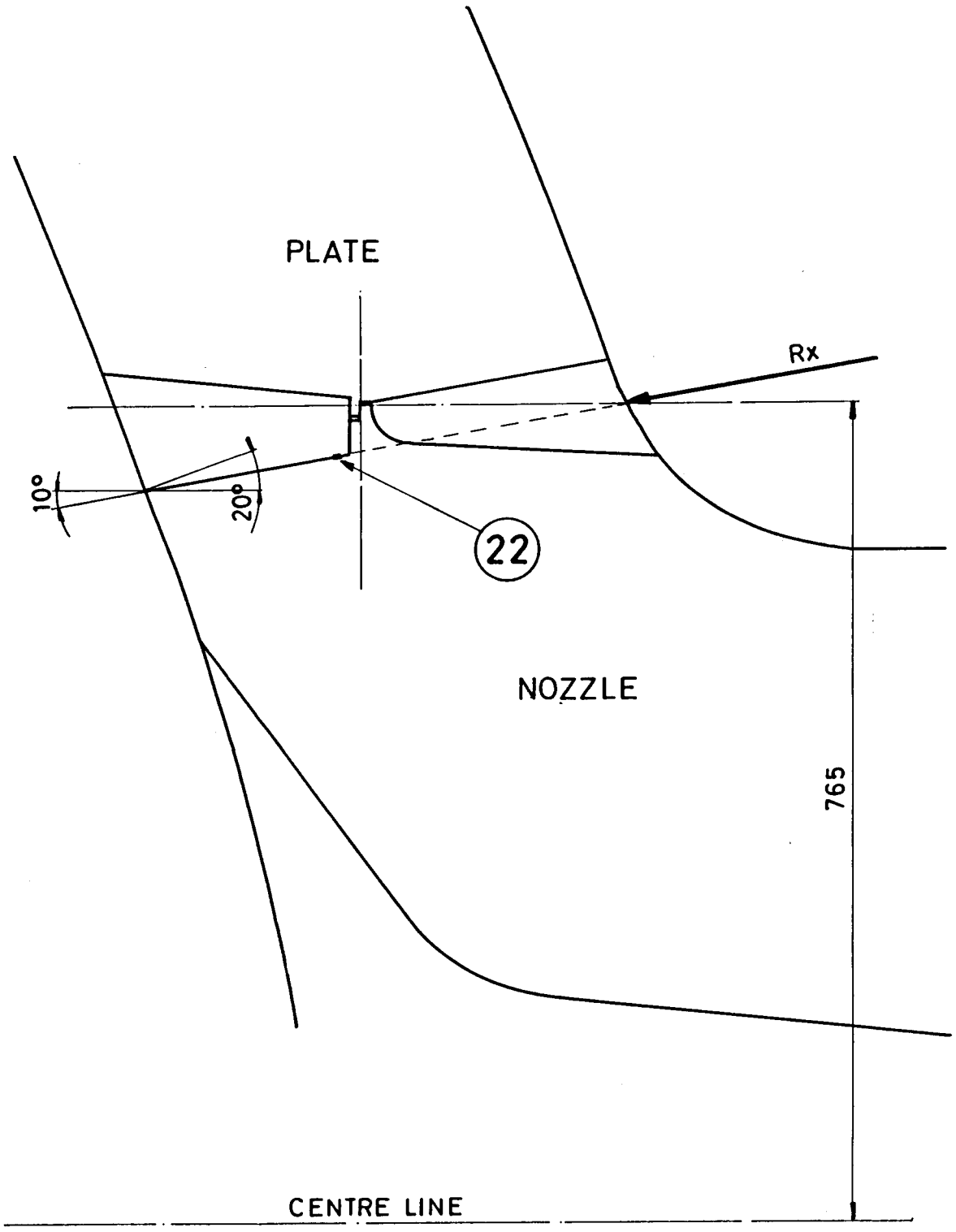


PLATE
Rx
10°
20°
22
NOZZLE
765
CENTRE LINE

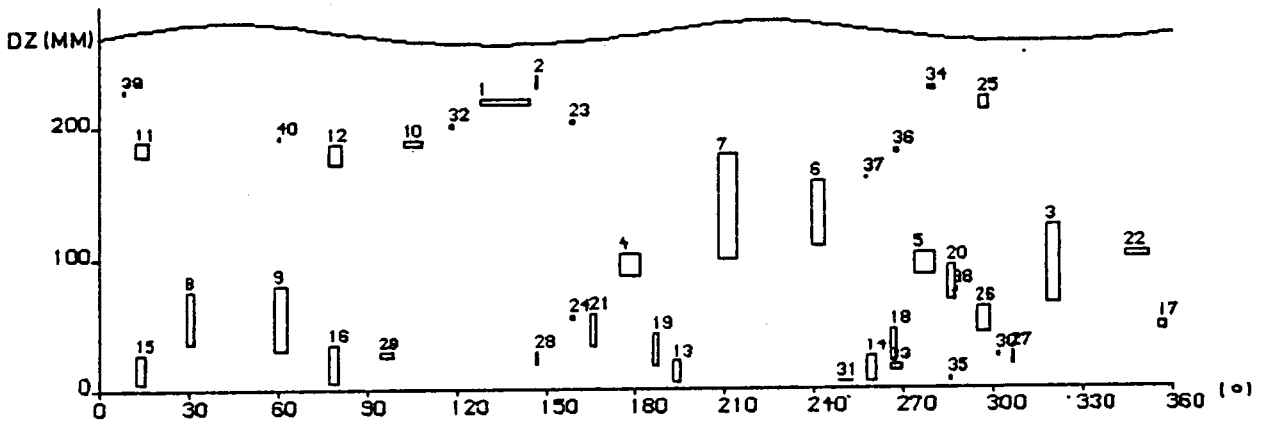
PISC II PLATE 3

DEFECT Nr. 23

DEFECT ENVELOPE COORDINATES

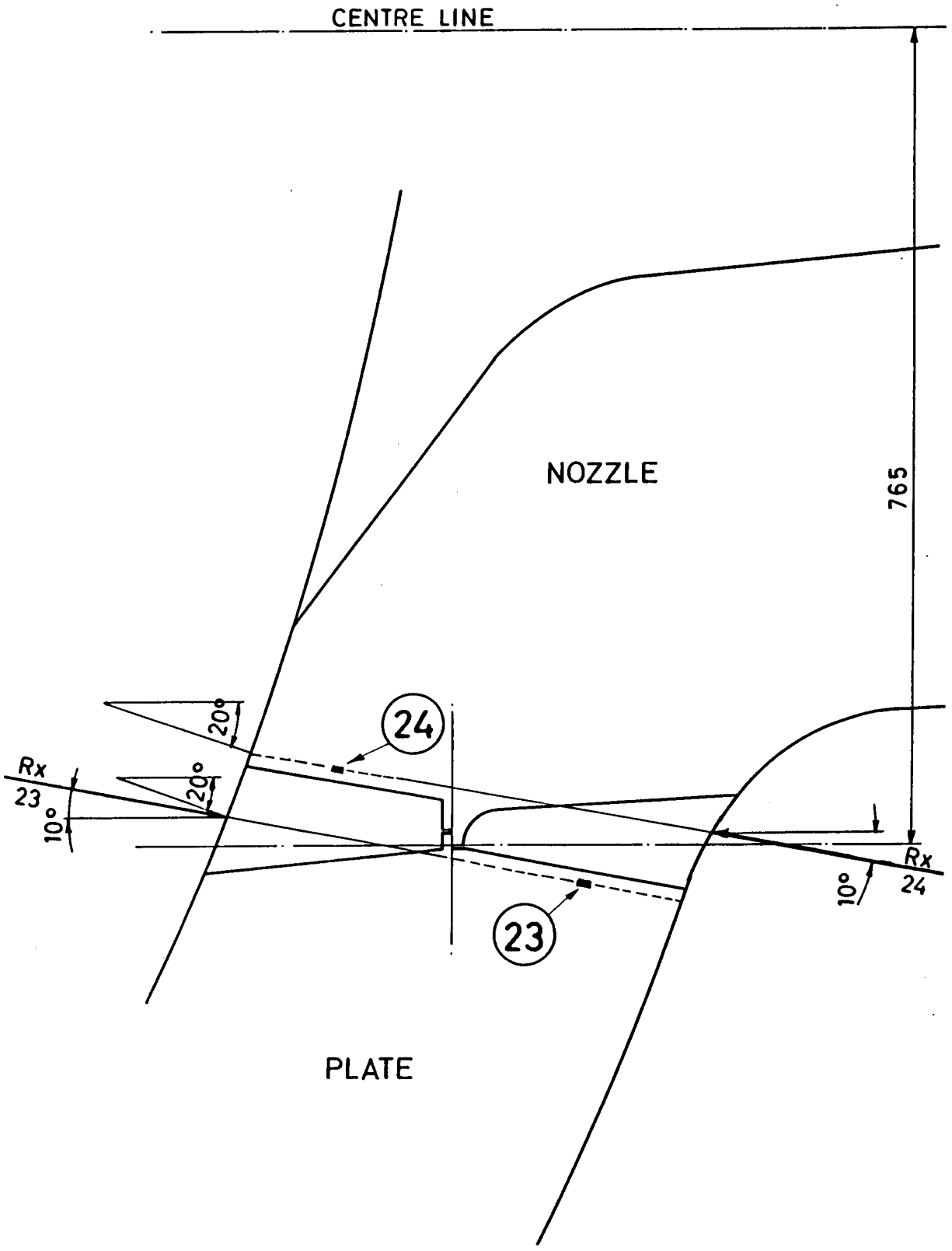
X_1 = 789,5mm	X_2 = 790 mm	ΔX = 0,5 mm
Y_1 = 2180 mm	Y_2 = 2199 mm	ΔY = 19 mm
Z_1 = 202 mm	Z_2 = 205 mm	ΔZ = 3 mm

DEFECT ENVELOPE DIMENSIONS



Defect type :
Lack of fusion

Radiograph insufficiently contrasted.
No positive available for illustration.


CENTRE LINE
NOZZLE
765
20°
24
Rx
23
20°
10°
Rx
24
10°
23
PLATE

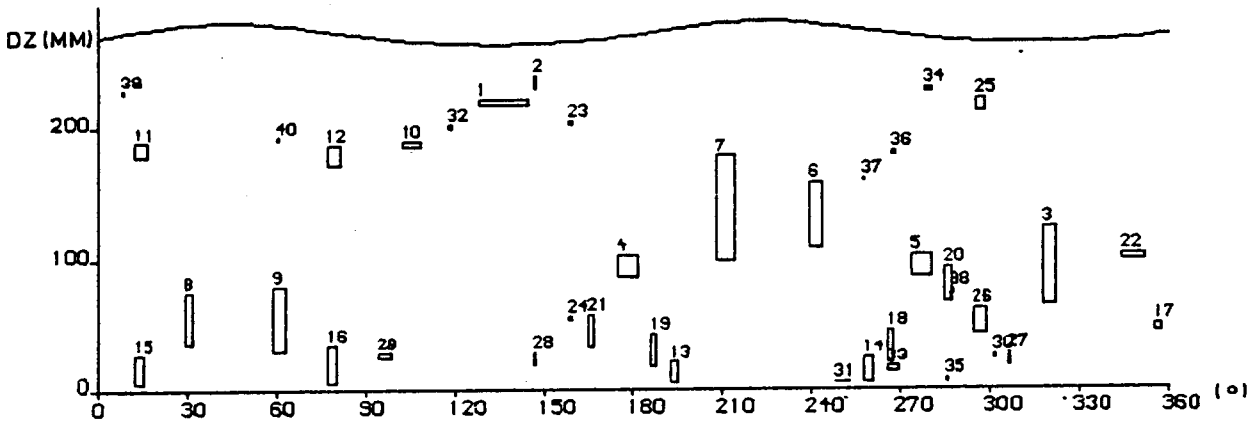
PISC II PLATE 3

DEFECT Nr. 24

DEFECT ENVELOPE COORDINATES

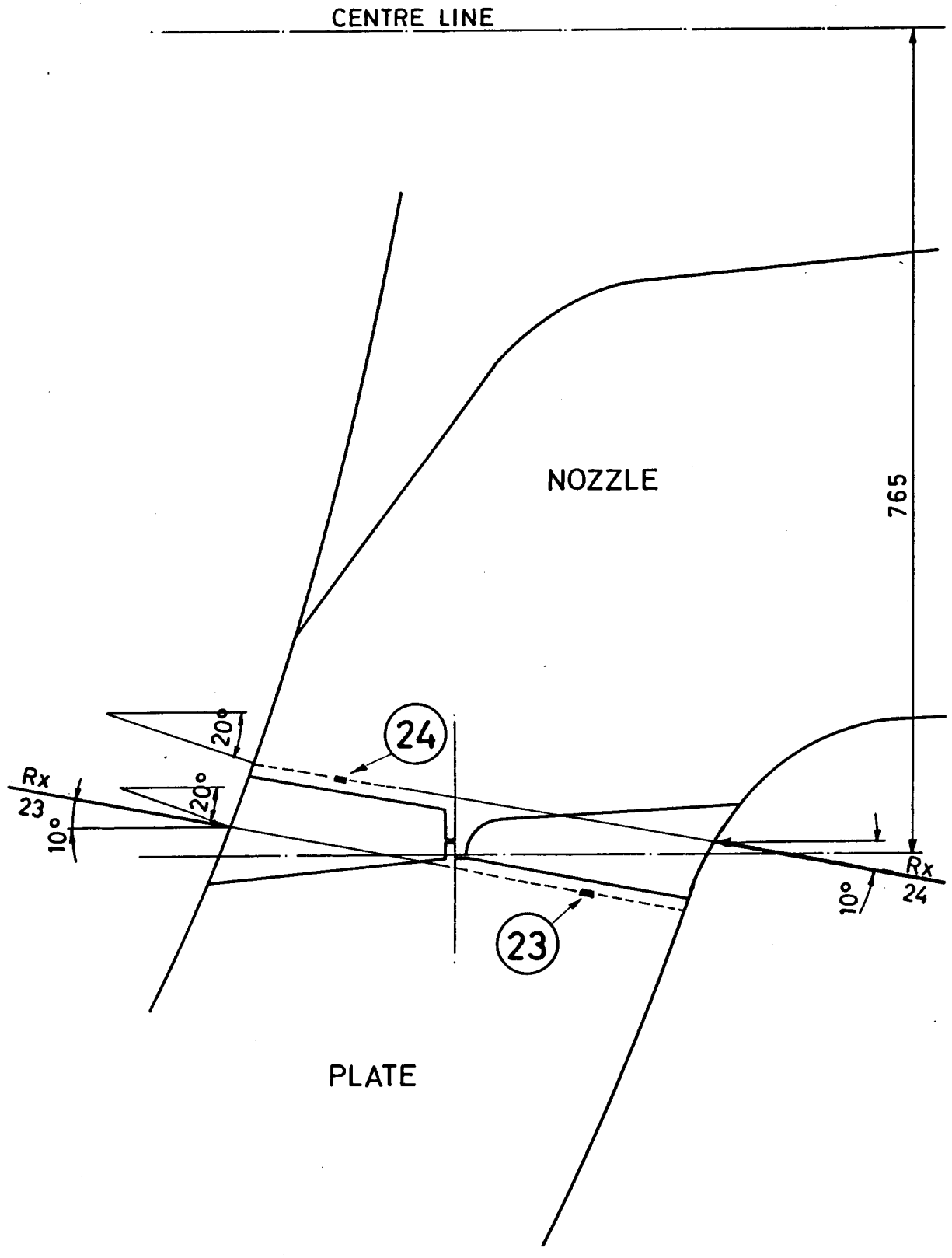
DEFECT ENVELOPE DIMENSIONS

X_1 =	729 mm	X_2 =	729.5 mm	ΔX =	0.5 mm
Y_1 =	2014 mm	Y_2 =	2039 mm	ΔY =	25 mm
Z_1 =	53 mm	Z_2 =	56 mm	ΔZ =	3 mm



Defect type :
Lack of fusion

Radiograph insufficiently contrasted.
No positive available for illustration.


CENTRE LINE
NOZZLE
765
20°
24
Rx
23
20°
10°
Rx
24
10°
23
PLATE

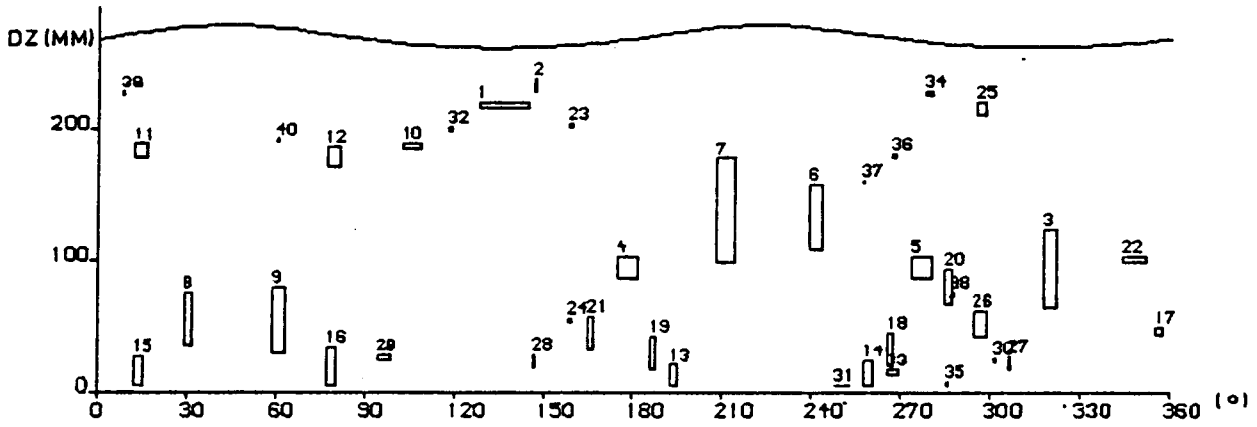
PISC II PLATE 3

DEFECT Nr. 25

DEFECT ENVELOPE COORDINATES

DEFECT ENVELOPE DIMENSIONS

X_1 =	735 mm	X_2 =	736.6 mm	ΔX =	1.6 mm
Y_1 =	3785 mm	Y_2 =	3823 mm	ΔY =	38 mm
Z_1 =	211 mm	Z_2 =	221 mm	ΔZ =	10 mm



Defect type :
Lack of fusion

Radiograph insufficiently contrasted.
No positive available for illustration.

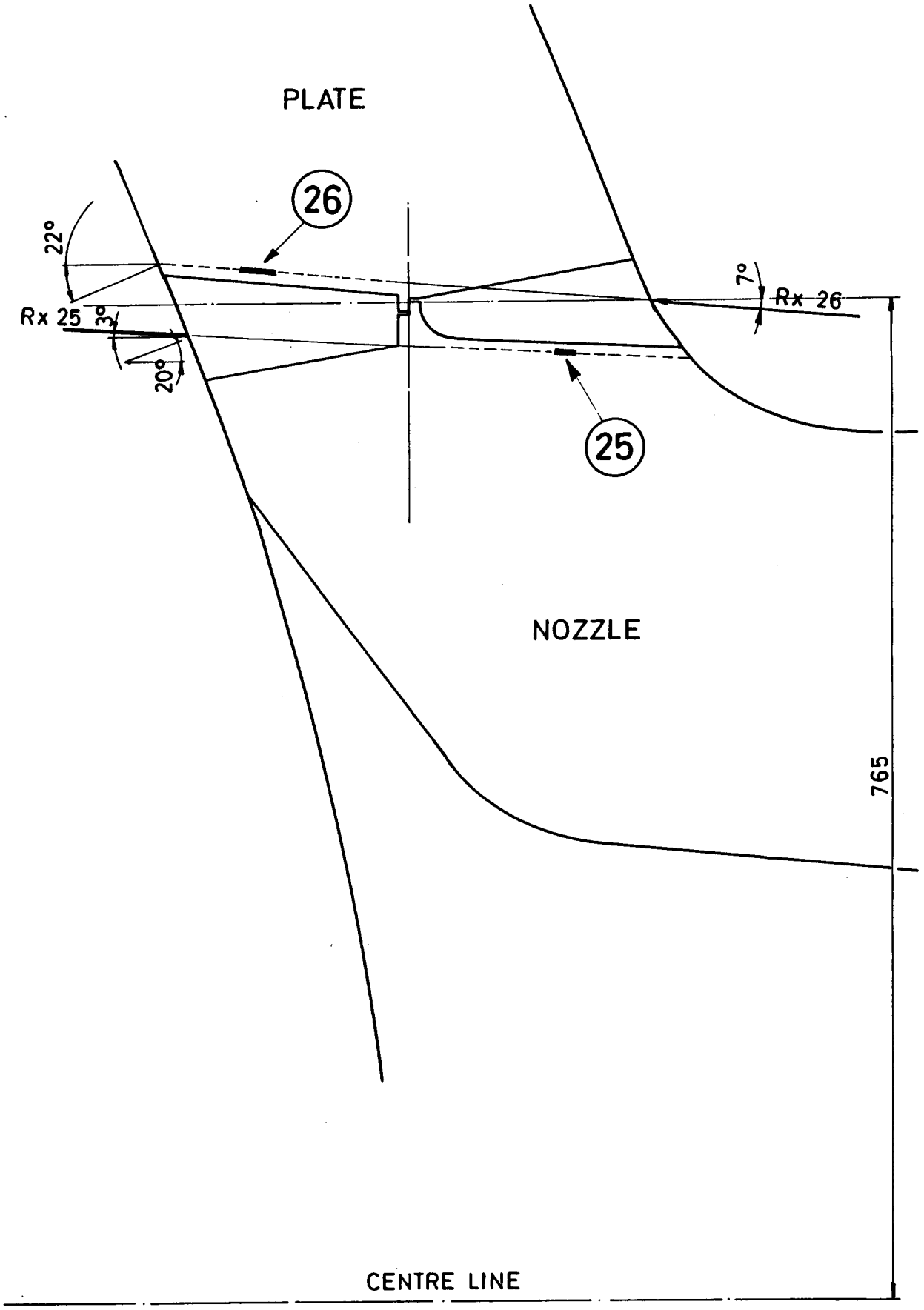


PLATE
26
22°
Rx 25
3°
20°
7°
Rx 26
25
NOZZLE
765
CENTRE LINE

PISC II PLATE 3

DEFECT Nr. 26

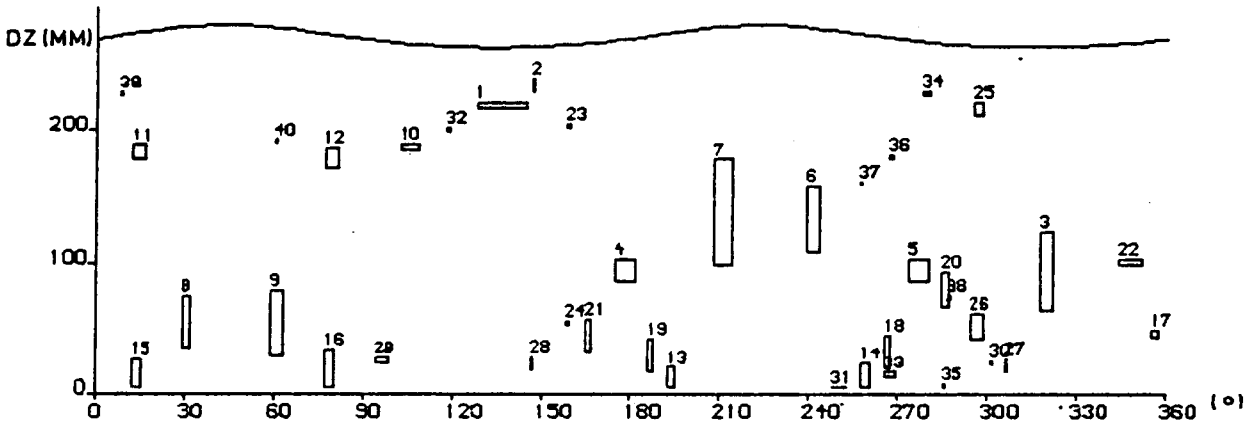
DEFECT ENVELOPE COORDINATES

X_1 = 791.7 mm
Y_1 = 4069 mm
Z_1 = 42 mm

X_2 = 793.4 mm
Y_2 = 4131 mm
Z_2 = 62 mm

DEFECT ENVELOPE DIMENSIONS

ΔX = 1.7 mm
ΔY = 62 mm
ΔZ = 20 mm



Defect type:
Lack of fusion

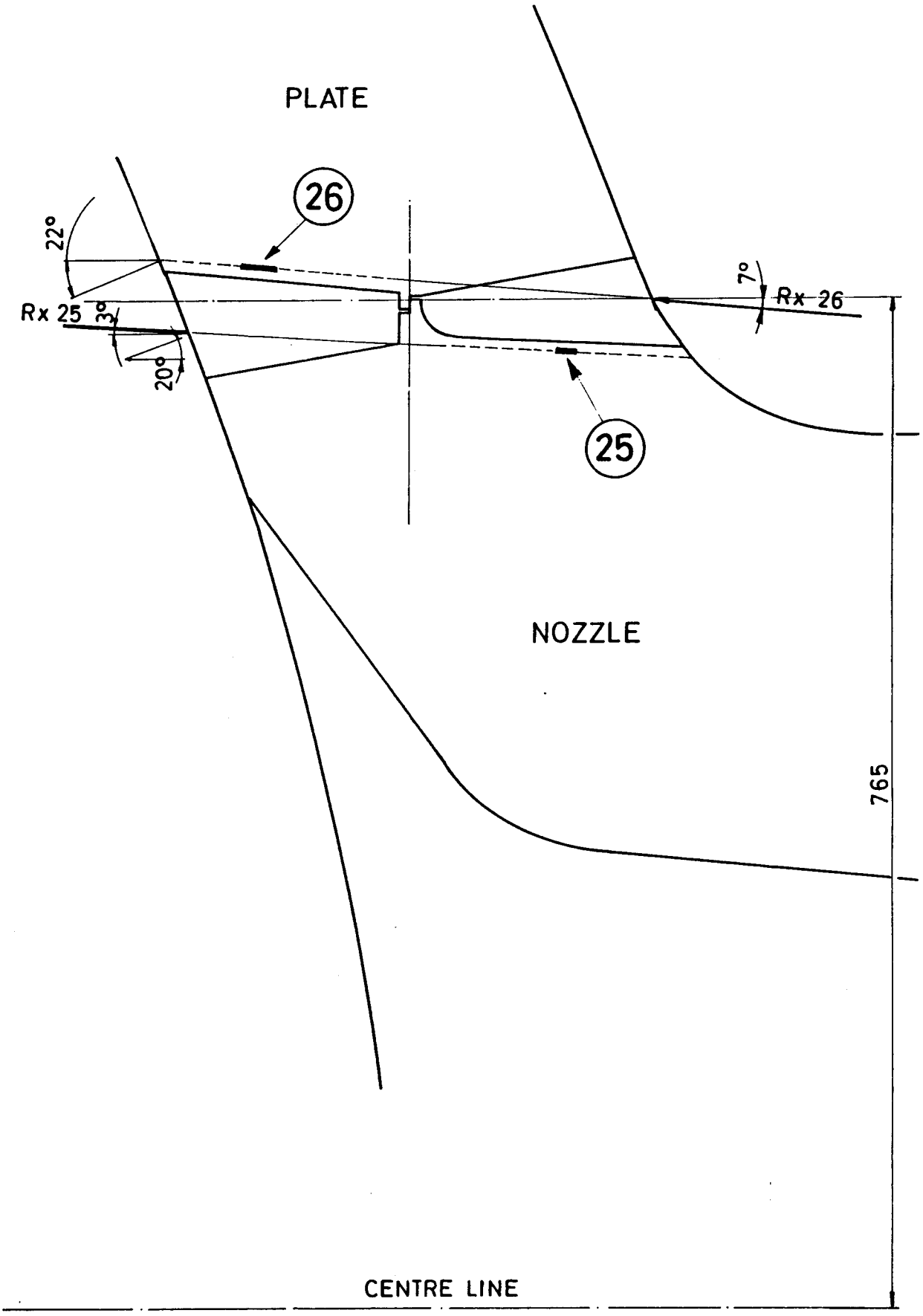
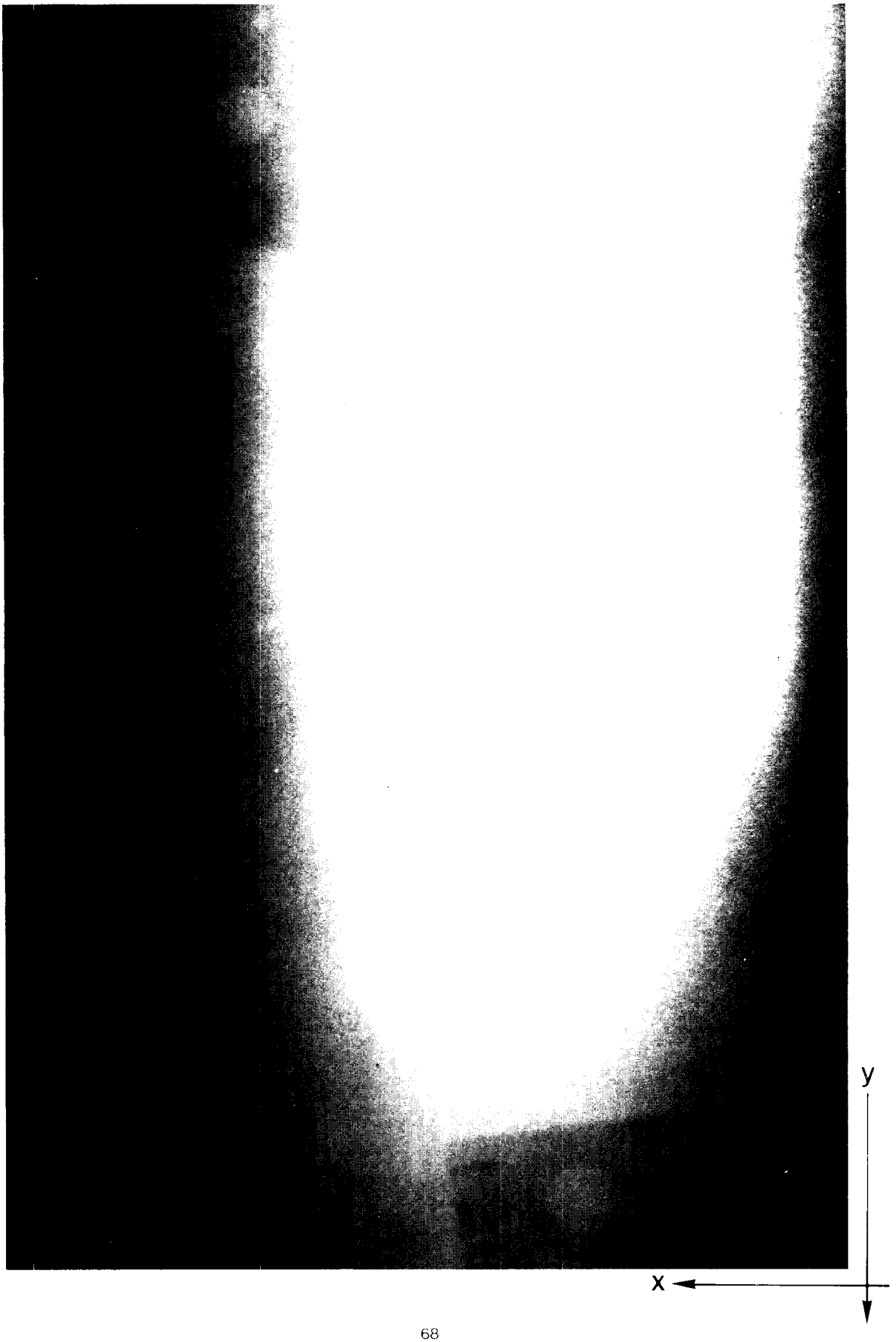


PLATE
26
22°
Rx 25
3°
20°
7°
Rx 26
25
NOZZLE
765
CENTRE LINE

Illustration of defect No. 26



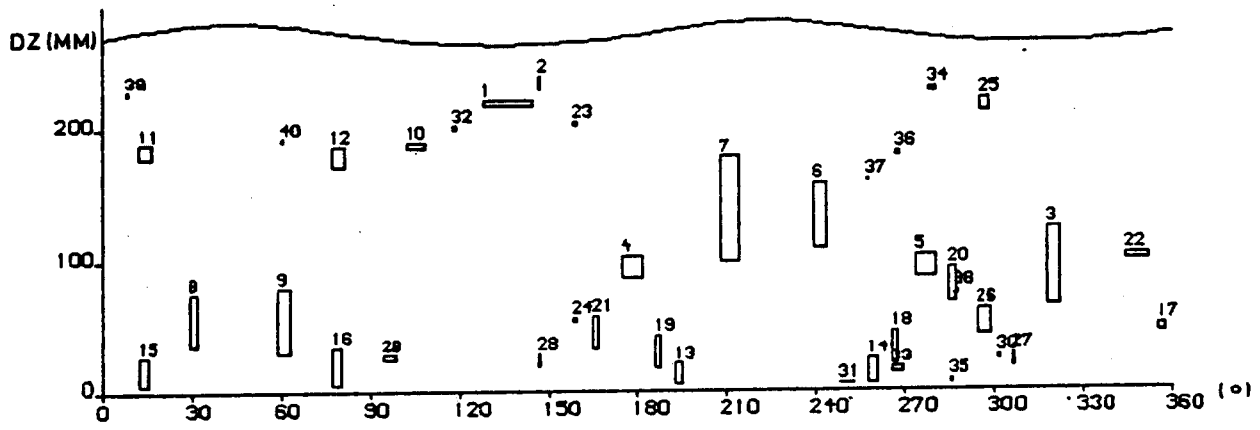
PISC II PLATE 3

DEFECT Nr. 27

DEFECT ENVELOPE COORDINATES

DEFECT ENVELOPE DIMENSIONS

X_1 = 712.7mm	X_2 = 715.3 mm	ΔX = 2.6 mm
Y_1 = 3814 mm	Y_2 = 3824 mm	ΔY = 10 mm
Z_1 = 17 mm	Z_2 = 27 mm	ΔZ = 10 mm



Defect type:
Sharp Smooth circular planar defect

Radiograph insufficiently contrasted.
No positive available for illustration.

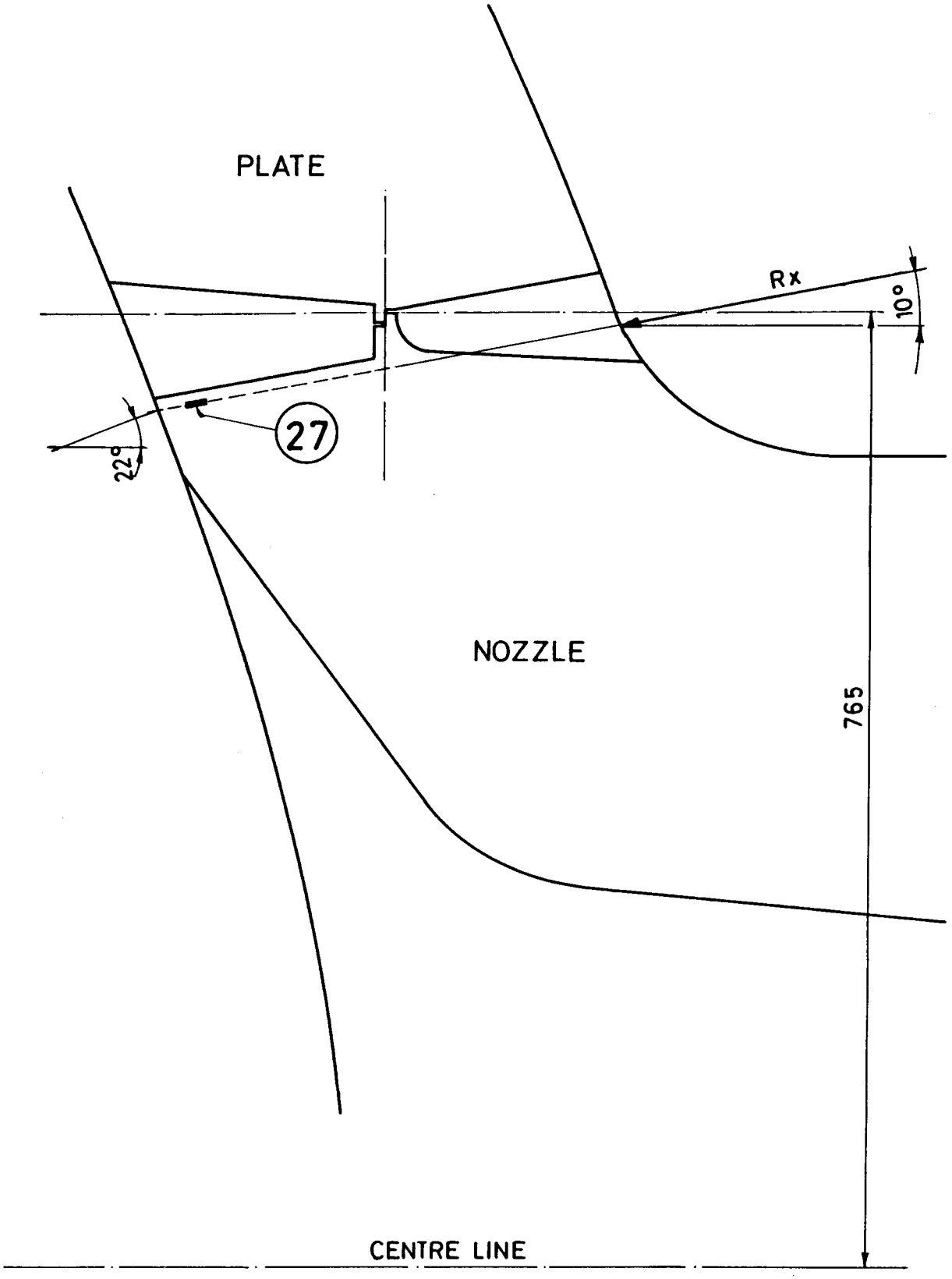


PLATE
Rx
10°
22°
27
NOZZLE
765
CENTRE LINE

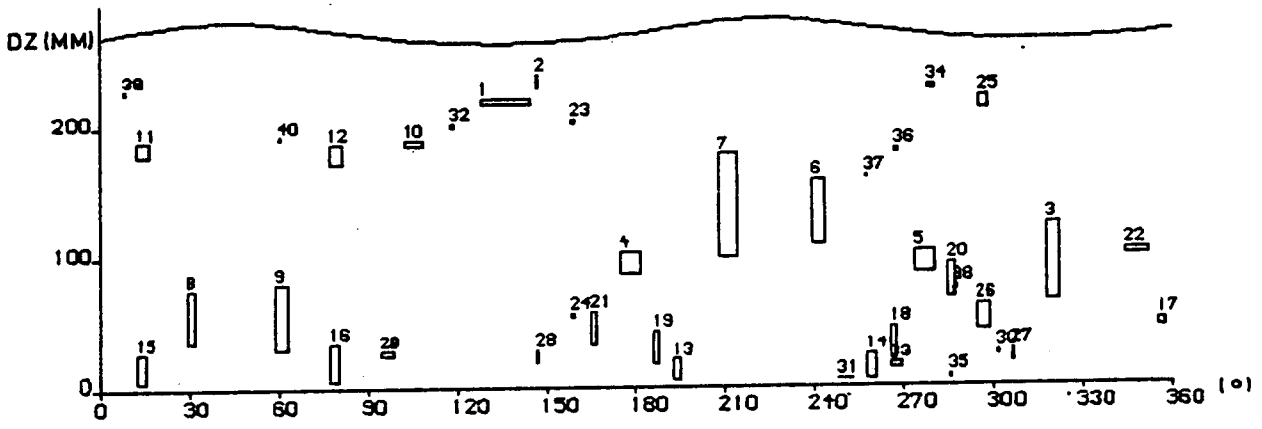
PISC II PLATE 3

DEFECT Nr. 28

DEFECT ENVELOPE COORDINATES

X_1 = 710 mm	X_2 = 711 mm	ΔX = 1 mm
Y_1 = 1817 mm	Y_2 = 1827 mm	ΔY = 10 mm
Z_1 = 19 mm	Z_2 = 29 mm	ΔZ = 10 mm

DEFECT ENVELOPE DIMENSIONS



Defect type;
Rough circular planar defect

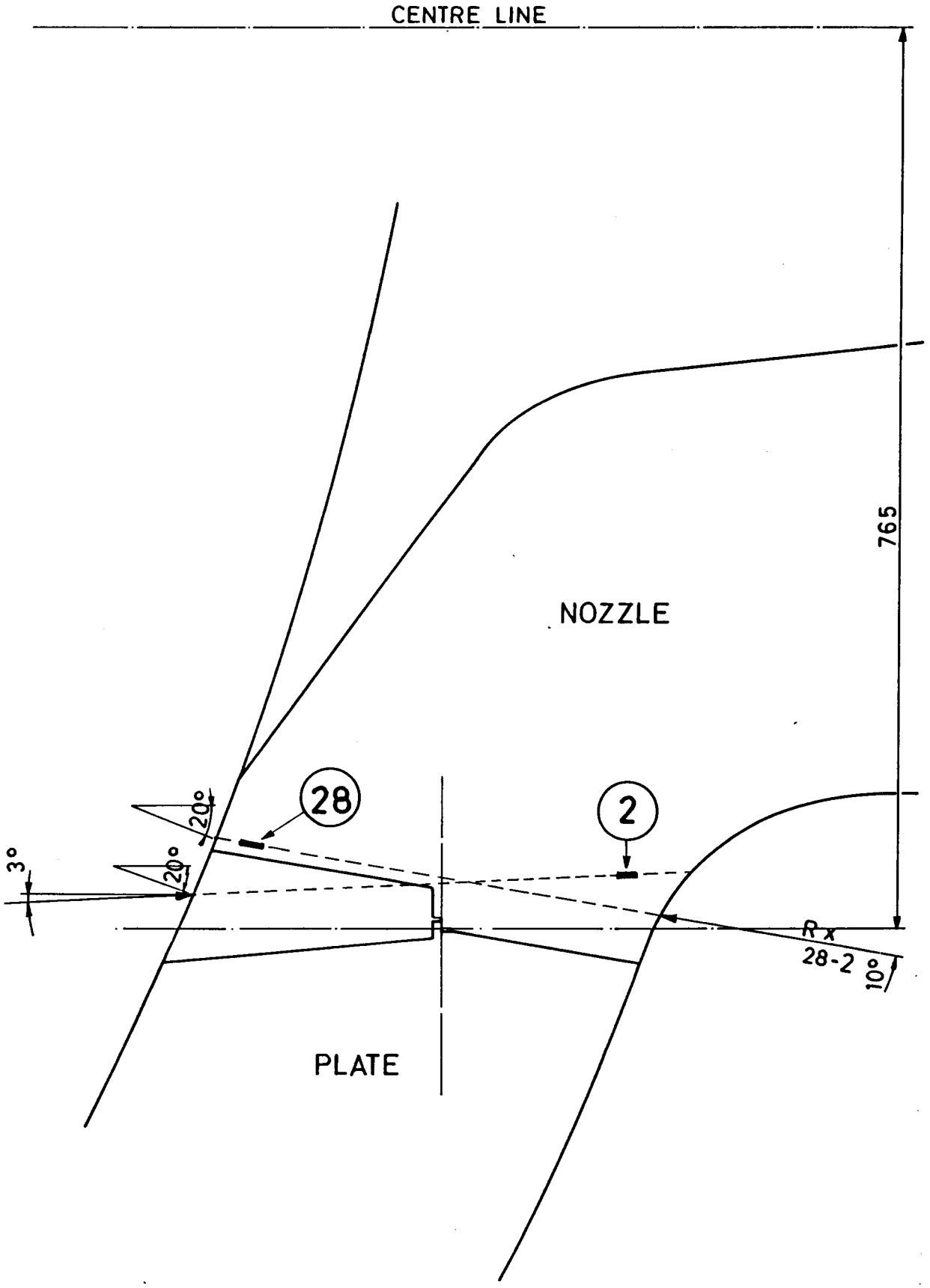
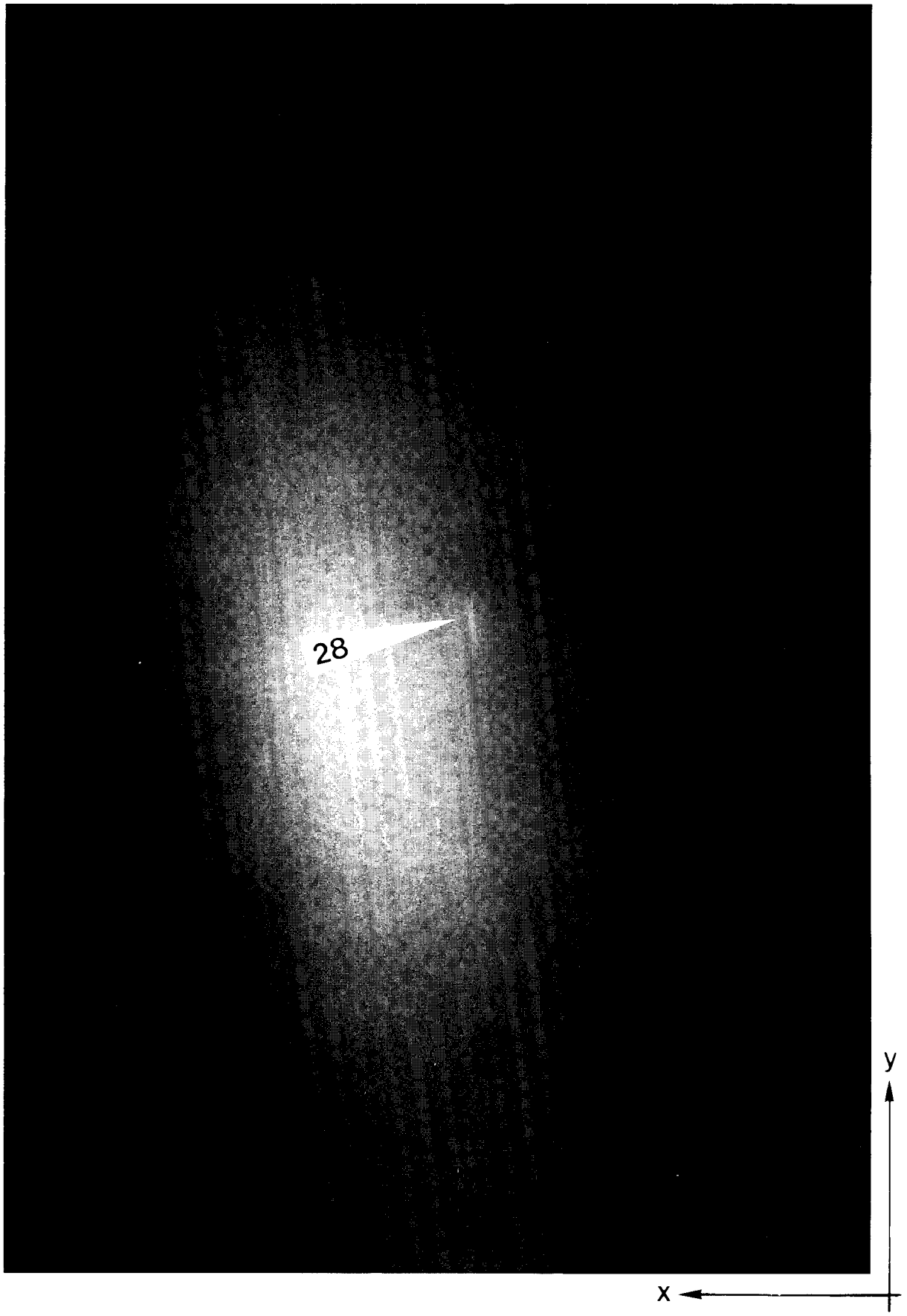

CENTRE LINE
765
NOZZLE
28
2
20°
20°
3°
Rx
28-2
10°
PLATE

Illustration of defect No. 28



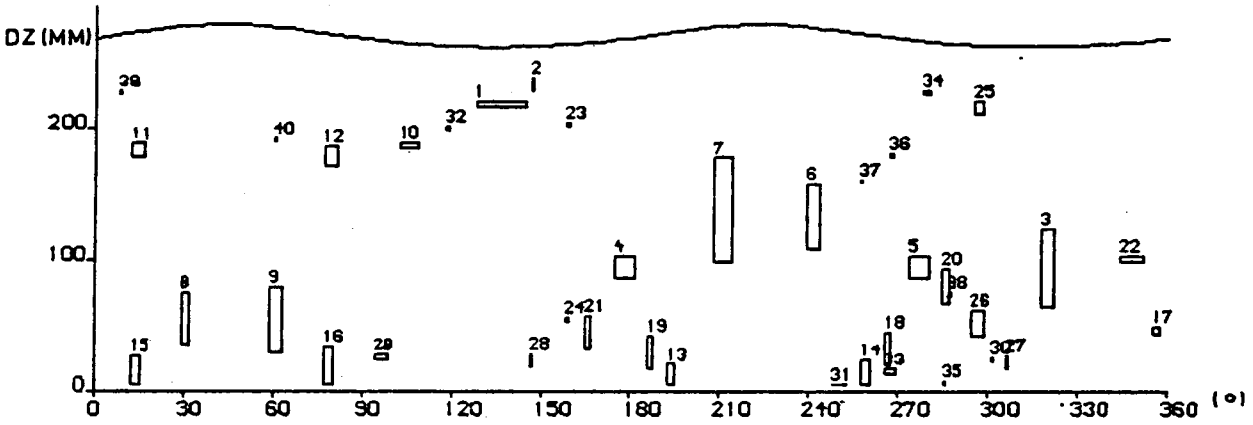
PISC II PLATE 3

DEFECT Nr. 29

DEFECT ENVELOPE COORDINATES

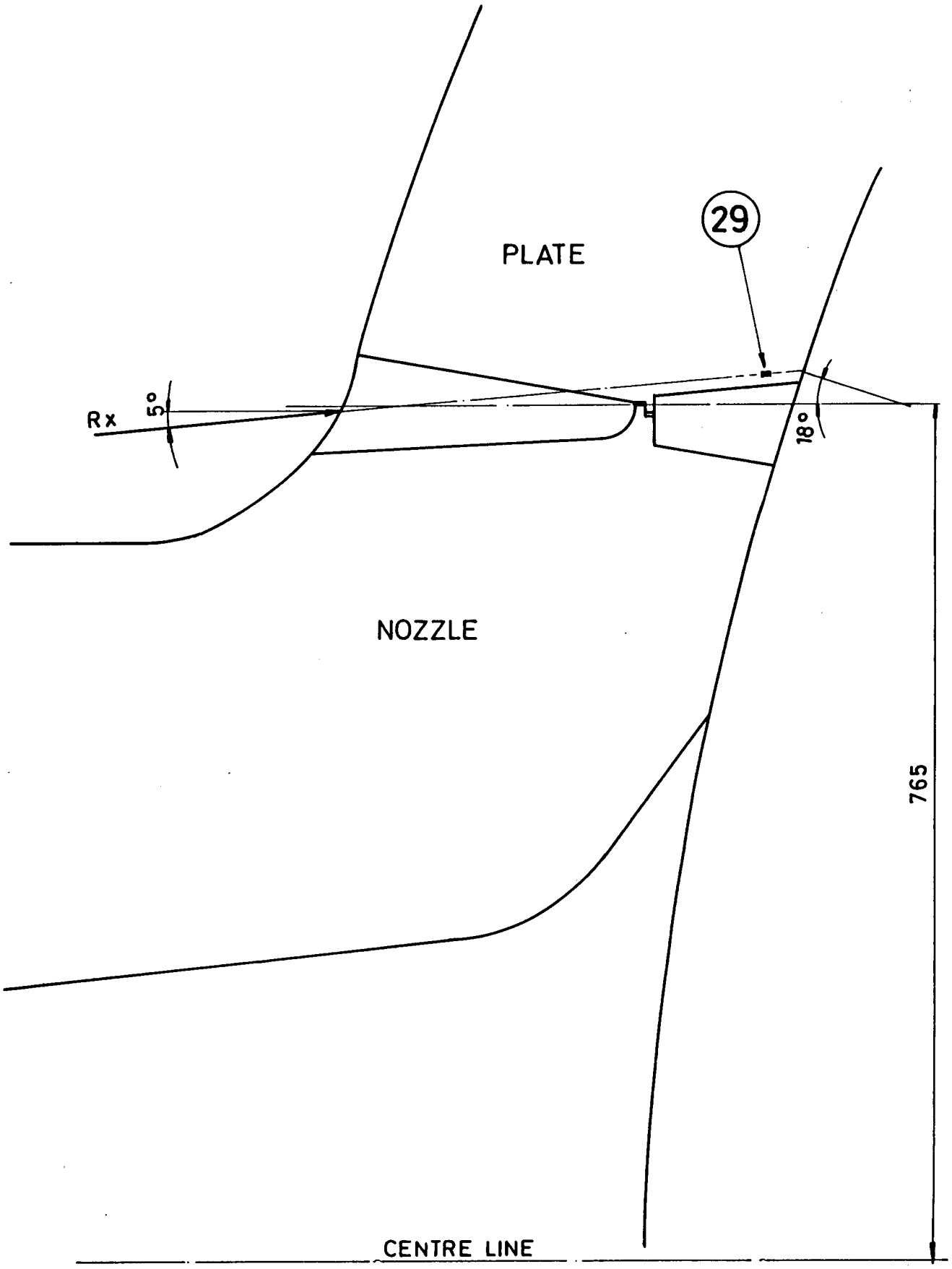
X_1 = 765 mm	X_2 = 769 mm	ΔX = 4 mm
Y_1 = 1260 mm	Y_2 = 1321 mm	ΔY = 61 mm
Z_1 = 25 mm	Z_2 = 28 mm	ΔZ = 3 mm

DEFECT ENVELOPE DIMENSIONS



Defect type:
Slag inclusion

Radiograph insufficiently contrasted.
No positive available for illustration.


29
PLATE
Rx
5°
18°
NOZZLE
765
CENTRE LINE

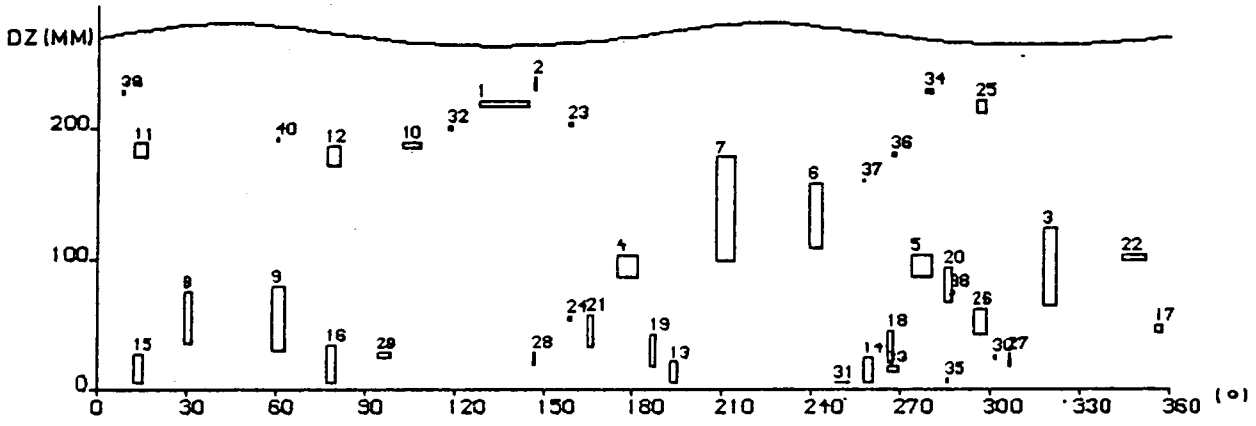
PISC II PLATE 3

DEFECT Nr. 30

DEFECT ENVELOPE COORDINATES

DEFECT ENVELOPE DIMENSIONS

X_1 =	794.5 mm	X_2 =	795.5 mm	ΔX =	1 mm
Y_1 =	4180 mm	Y_2 =	4183 mm	ΔY =	3 mm
Z_1 =	22.5 mm	Z_2 =	25.5 mm	ΔZ =	3 mm



Defect type:

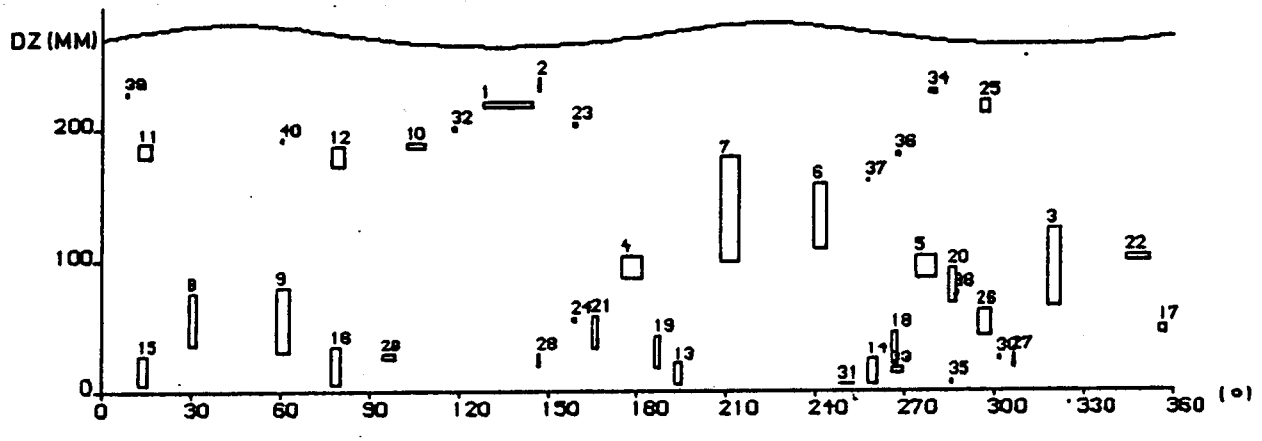
Smooth Sharp small circular planar defect

Radiograph insufficiently contrasted.
No positive available for illustration.

PISC II PLATE 3 **DEFECT Nr31**

DEFECT ENVELOPE COORDINATES **DEFECT ENVELOPE DIMENSIONS**

X_1 = 770 mm	X_2 = 795 mm	ΔX = 25 mm
Y_1 = 3385 mm	Y_2 = 3447 mm	ΔY = 62 mm
Z_1 = 4.5 mm	Z_2 = 5 mm	ΔZ = 0.5 mm



Defect type
Lack a bonding

No positive available for illustration

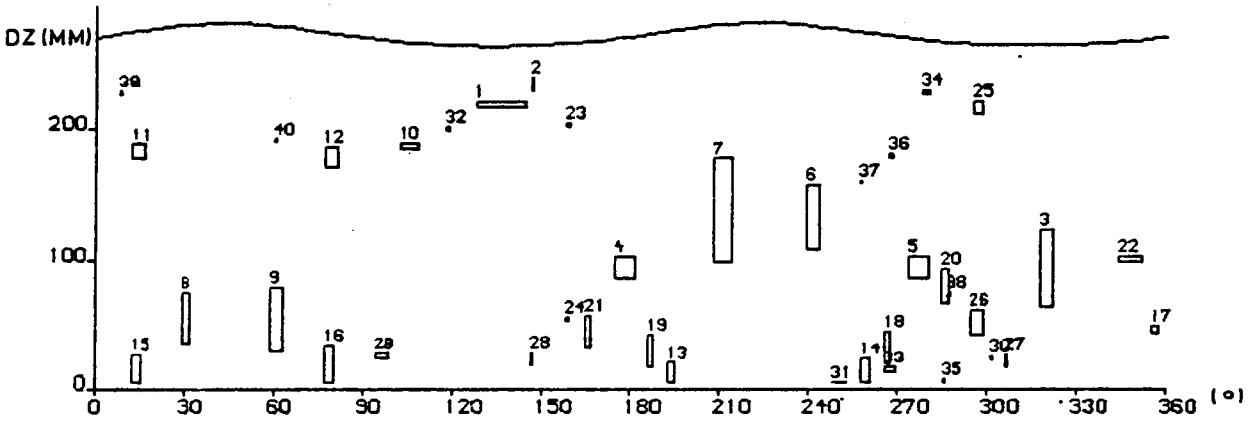
PISC II PLATE 3

DEFECT Nr. 32

DEFECT ENVELOPE COORDINATES

X_1 = 730 mm	X_2 = 738 mm	ΔX = 8 mm
Y_1 = 1512 mm	Y_2 = 1526 mm	ΔY = 14 mm
Z_1 = 199 mm	Z_2 = 202 mm	ΔZ = 3 mm

DEFECT ENVELOPE DIMENSIONS



Radiograph insufficiently contrasted.
No positive available for illustration.

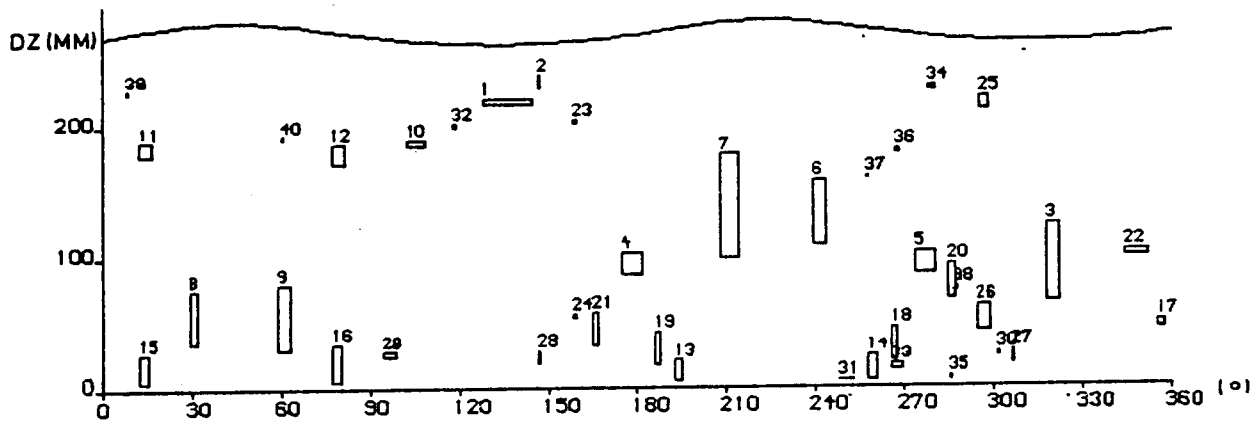
PISC II PLATE 3

DEFECT Nr. 33

DEFECT ENVELOPE COORDINATES

DEFECT ENVELOPE DIMENSIONS

X_1 =	745 mm	X_2 =	759 mm	ΔX =	14 mm
Y_1 =	3487 mm	Y_2 =	3529 mm	ΔY =	42 mm
Z_1 =	13 mm	Z_2 =	17 mm	ΔZ =	4 mm



Radiograph insufficiently contrasted.
No positive available for illustration.

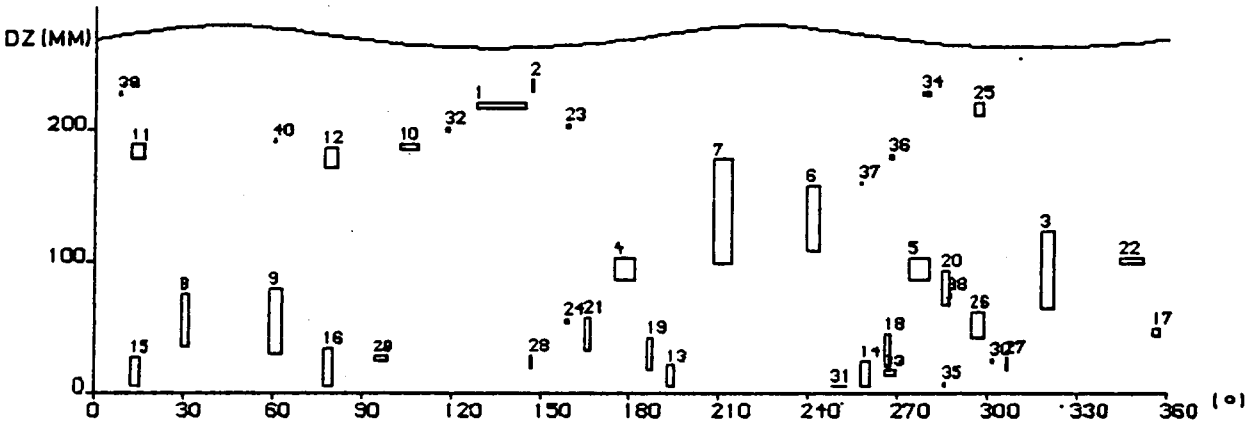
PISC II PLATE 3

DEFECT Nr. 34

DEFECT ENVELOPE COORDINATES

X_1 = 775 mm	X_2 = 783 mm	ΔX = 8 mm
Y_1 = 3778 mm	Y_2 = 3812 mm	ΔY = 34 mm
Z_1 = 227 mm	Z_2 = 230 mm	ΔZ = 3 mm

DEFECT ENVELOPE DIMENSIONS



Radiograph insufficiently contrasted.
No positive available for illustration.

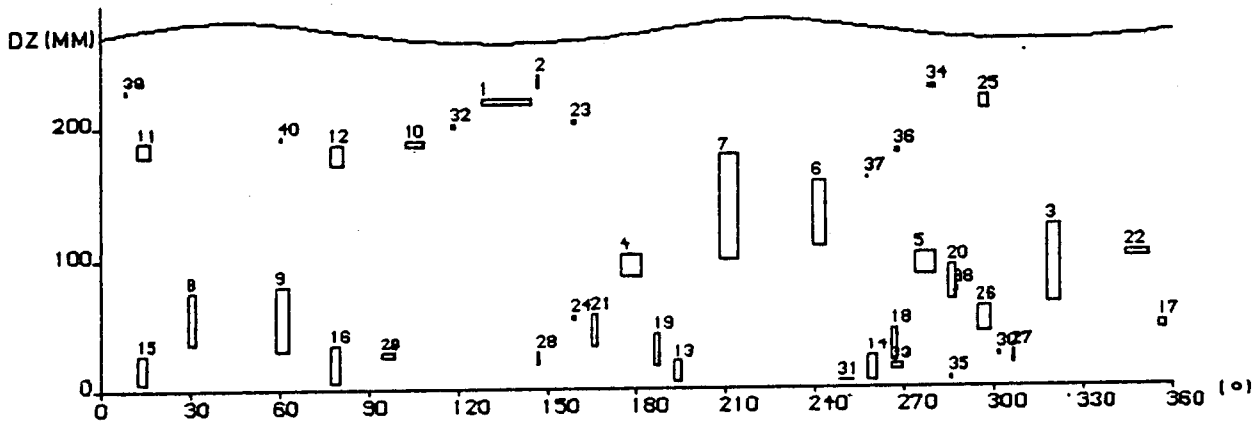
PISC II PLATE 3

DEFECT Nr. 35

DEFECT ENVELOPE COORDINATES

DEFECT ENVELOPE DIMENSIONS

X_1 =	818 mm	X_2 =	821 mm	ΔX =	3 mm
Y_1 =	4075 mm	Y_2 =	4085 mm	ΔY =	10 mm
Z_1 =	5 mm	Z_2 =	8 mm	ΔZ =	3 mm



Radiograph insufficiently contrasted.
No positive available for illustration.

PISC II PLATE 3

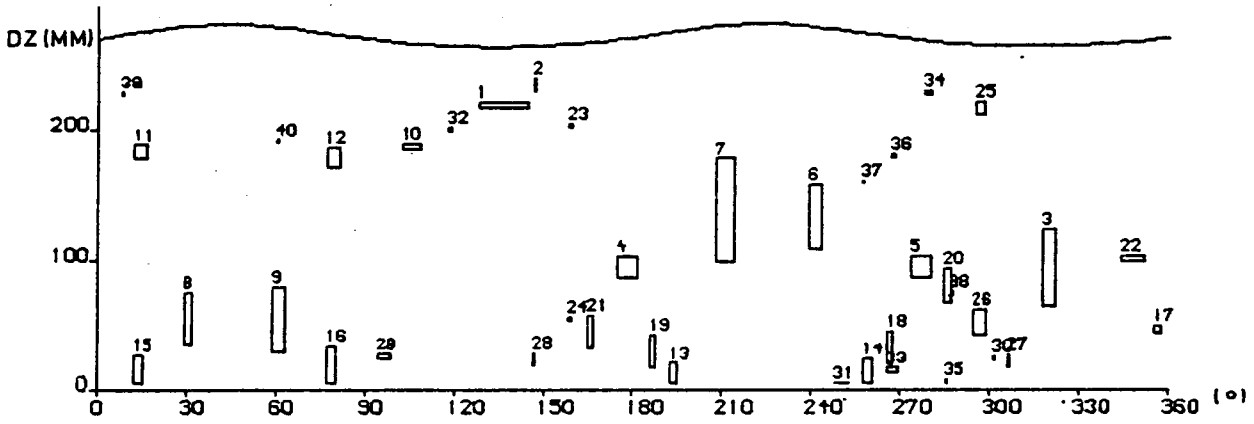
DEFECT Nr.36

DEFECT ENVELOPE COORDINATES

X_1 = 770 mm	X_2 = 779 mm	
Y_1 = 3607 mm	Y_2 = 3621 mm	
Z_1 = 178 mm	Z_2 = 182 mm	

DEFECT ENVELOPE DIMENSIONS

ΔX = 9 mm	
ΔY = 14 mm	
ΔZ = 4 mm	



Radiograph insufficiently contrasted.
No positive available for illustration.

PISC II PLATE 3

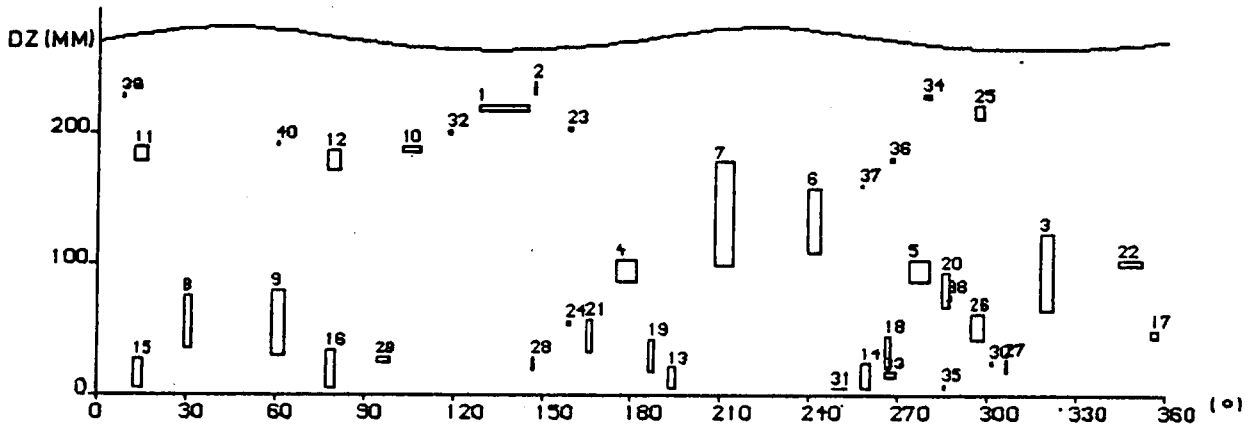
DEFECT Nr. 37

DEFECT ENVELOPE COORDINATES

X_1 = 746 mm	X_2 = 754 mm	
Y_1 = 3364 mm	Y_2 = 3371 mm	
Z_1 = 159 mm	Z_2 = 161 mm	

DEFECT ENVELOPE DIMENSIONS

ΔX = 8	mm
ΔY = 7	mm
ΔZ = 2	mm



Radiograph insufficiently contrasted.
No positive available for illustration.

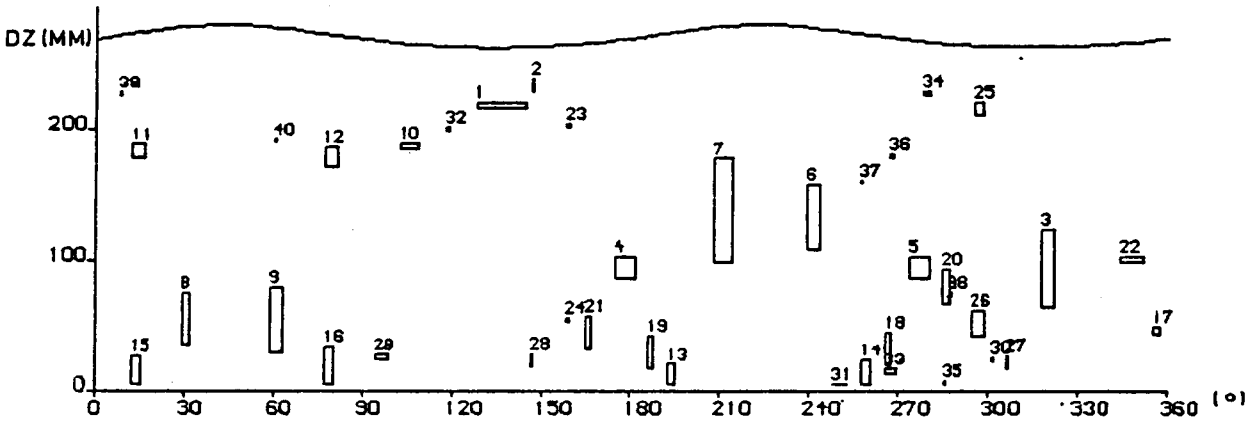
PISC II PLATE 3

DEFECT Nr. 38

DEFECT ENVELOPE COORDINATES

X_1 = 740 mm	X_2 = 742 mm	ΔX = 2 mm
Y_1 = 3708 mm	Y_2 = 3720 mm	ΔY = 12 mm
Z_1 = 73 mm	Z_2 = 75 mm	ΔZ = 2 mm

DEFECT ENVELOPE DIMENSIONS



Radiograph insufficiently contrasted.
No positive available for illustration.

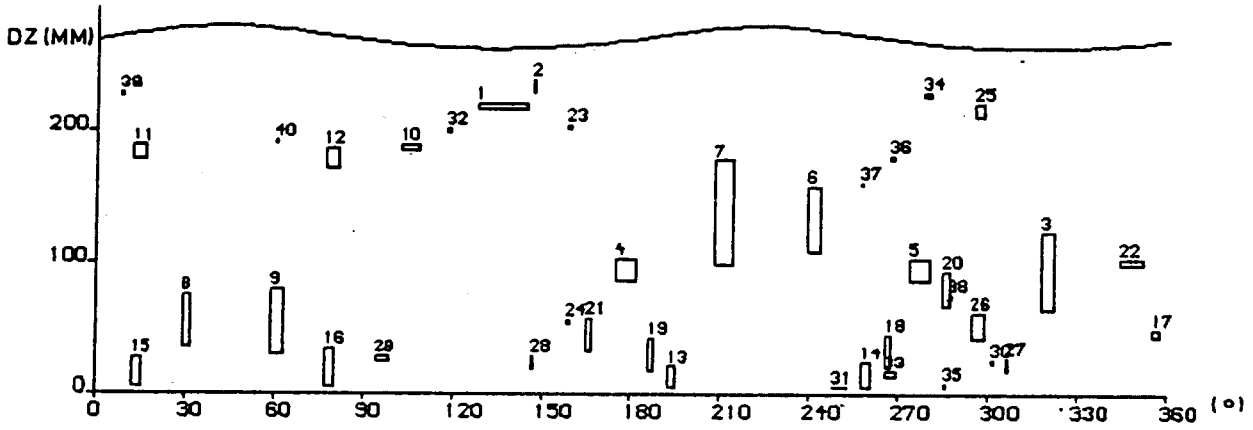
PISC II PLATE 3

DEFECT Nr. 39

DEFECT ENVELOPE COORDINATES

X_1 = 770 mm	X_2 = 773 mm	ΔX = 3 mm
Y_1 = 108 mm	Y_2 = 113 mm	ΔY = 5 mm
Z_1 = 227 mm	Z_2 = 229 mm	ΔZ = 2 mm

DEFECT ENVELOPE DIMENSIONS



Radiograph insufficiently contrasted.
No positive available for illustration.

PISC II PLATE 3

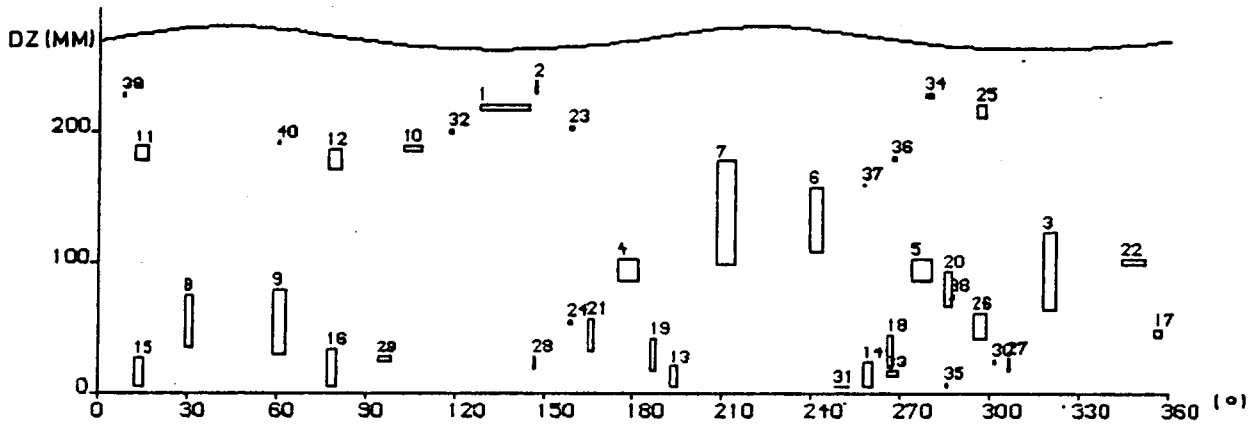
DEFECT Nr. 40

DEFECT ENVELOPE COORDINATES

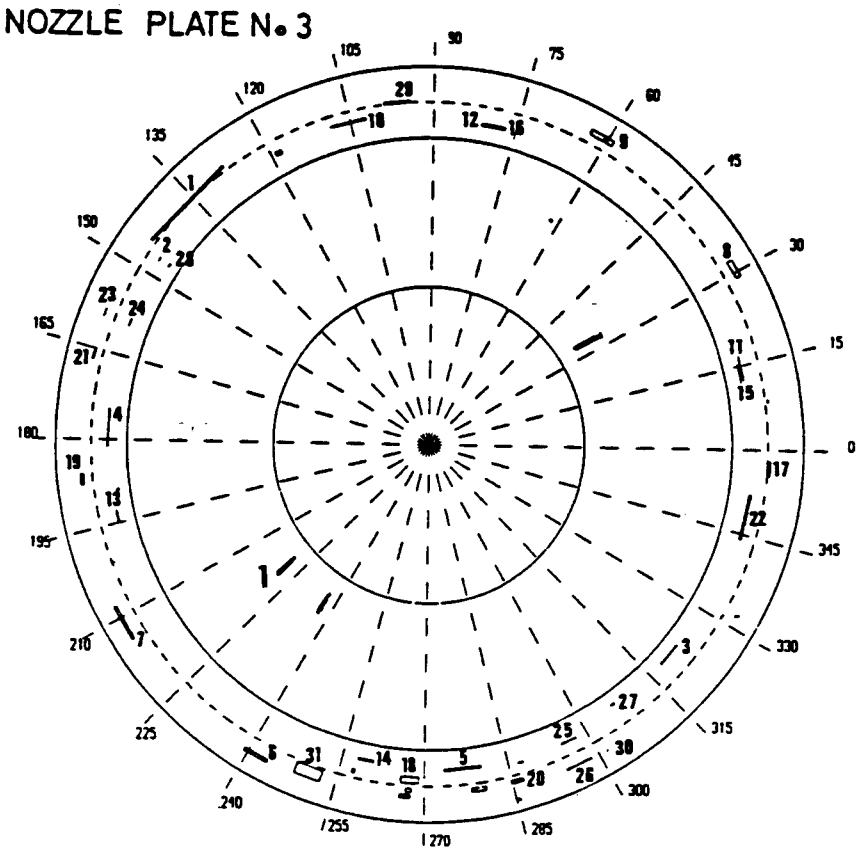
X_1	=	787	mm	X_2	=	799	mm
Y_1	=	835	mm	Y_2	=	839	mm
Z_1	=	191	mm	Z_2	=	193	mm

DEFECT ENVELOPE DIMENSIONS

ΔX =	12	mm
ΔY =	4	mm
ΔZ =	2	mm



Radiograph insufficiently contrasted.
No positive available for illustration.



Inner radius cracks positions in Plate No. 3.

Defect		Angular position (°)	DX (mm)	DY (mm)	DZ (mm)
Plate 3	1	220	19	1,5	32,5
	2	230	16	1,5	28,5
	3	35	19	1,5	32,5

Co-ordinates of the inner radius cracks envelopes in plate No. 3.

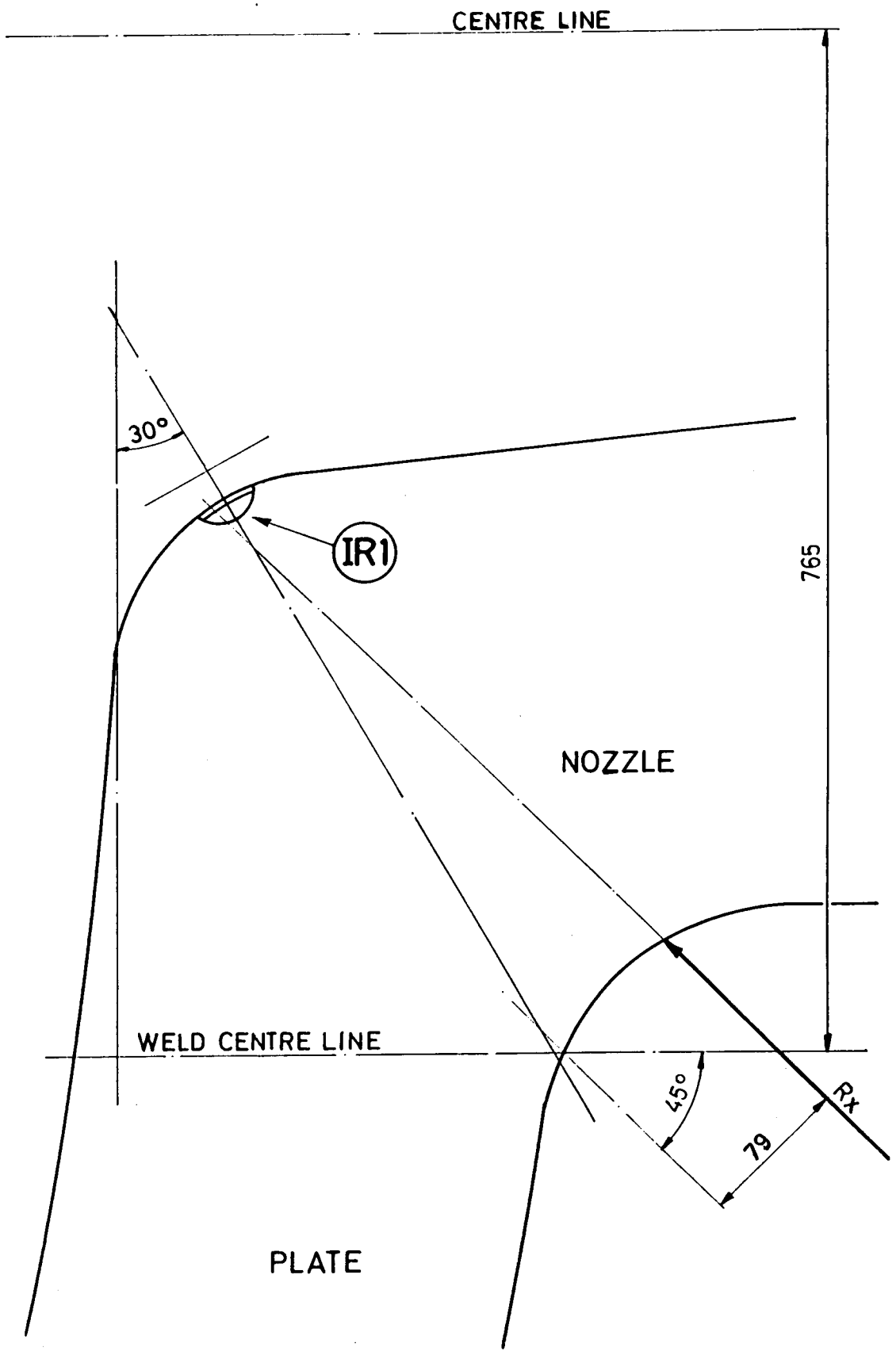
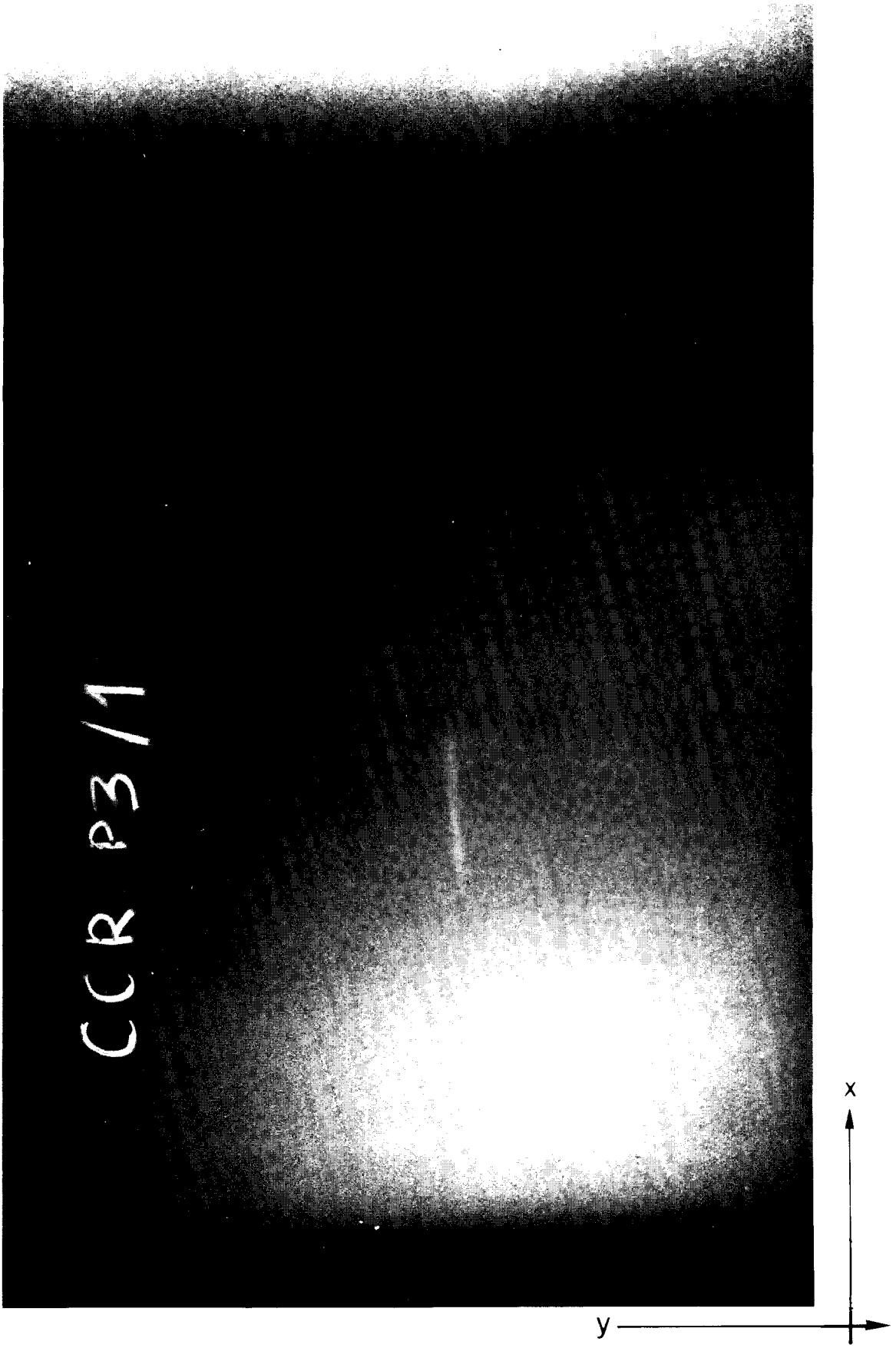
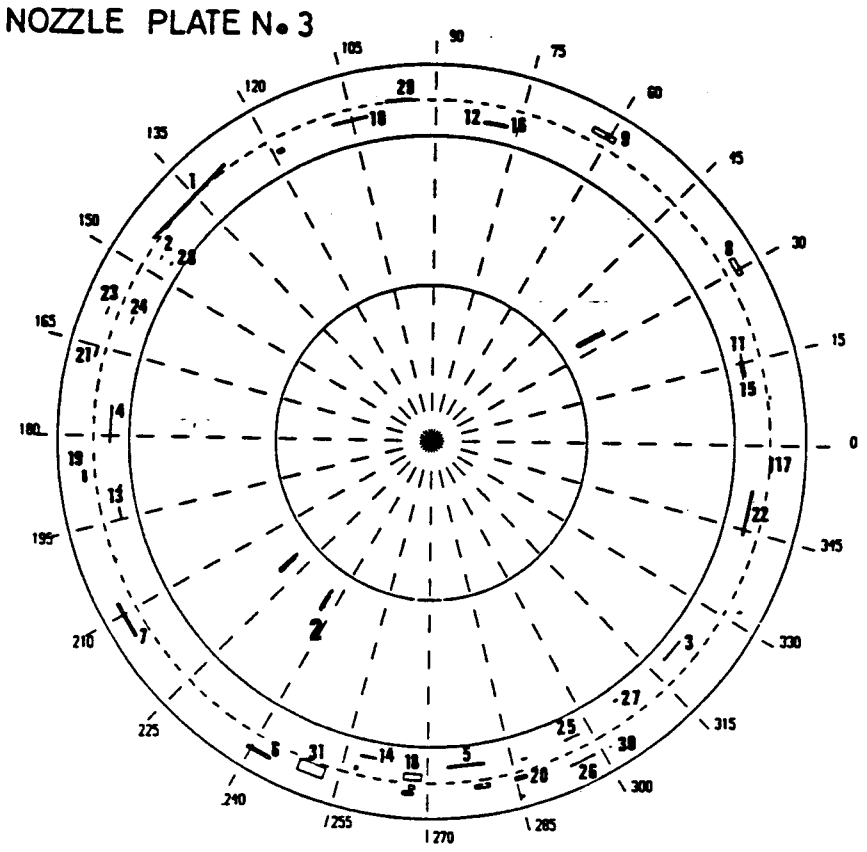

CENTRE LINE
30°
IR1
765
NOZZLE
WELD CENTRE LINE
45°
79
Rx
PLATE

Illustration of defect No. IR 1





Inner radius cracks positions in Plate No. 3.

Defect		Angular position (°)	DX (mm)	DY (mm)	DZ (mm)
Plate 3	1	220	19	1,5	32,5
	2	230	16	1,5	28,5
	3	35	19	1,5	32,5

Co-ordinates of the inner radius cracks envelopes in plate No. 3.

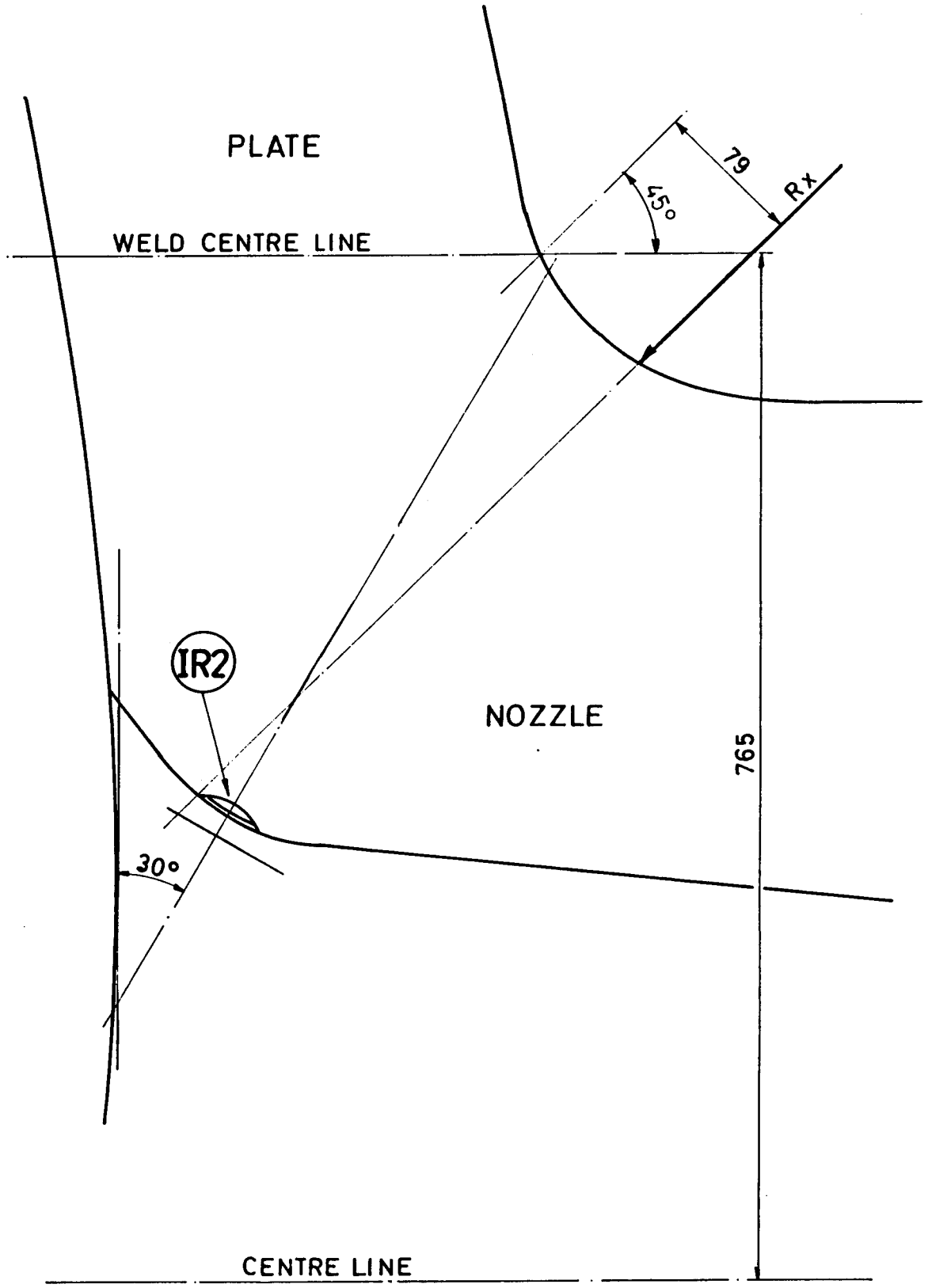
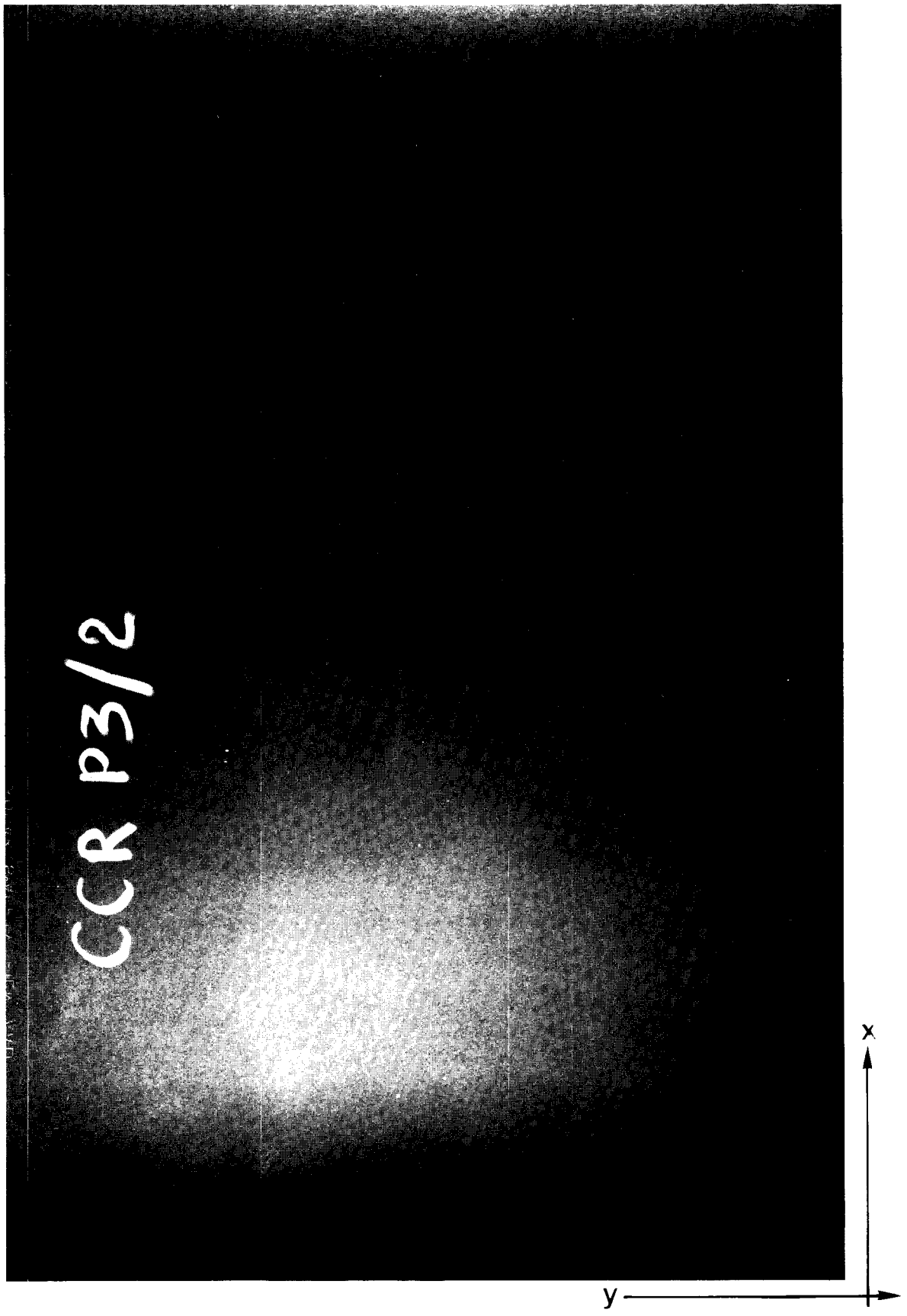
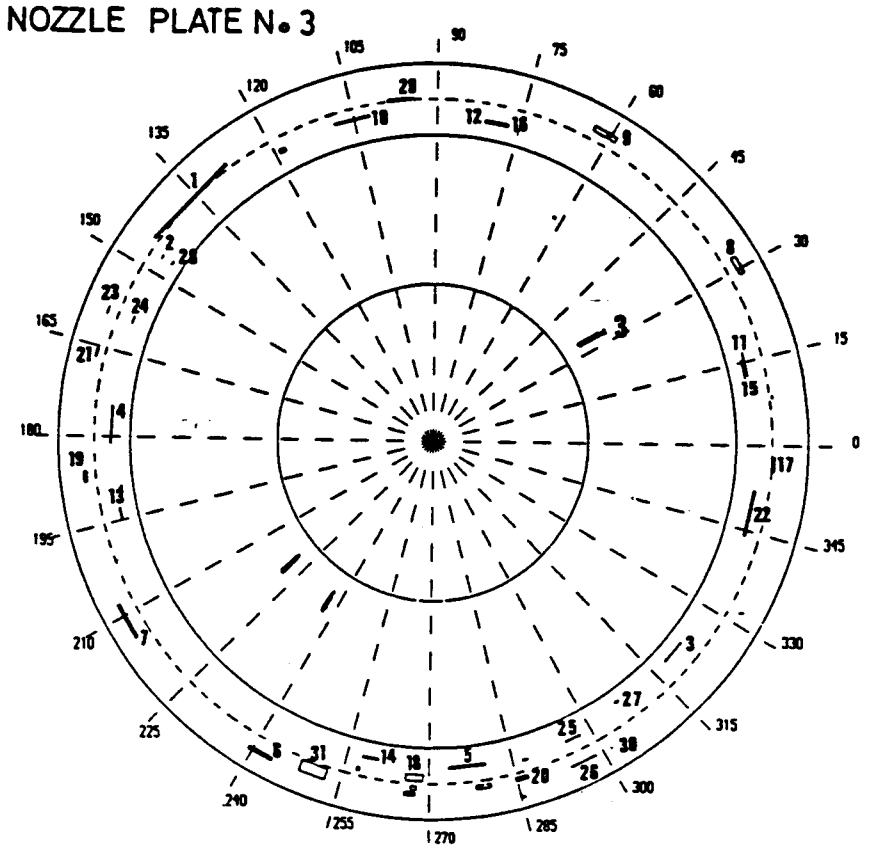


PLATE
WELD CENTRE LINE
79
45°
Rx
IR2
NOZZLE
765
30°
CENTRE LINE

Illustration of defect No. IR 2

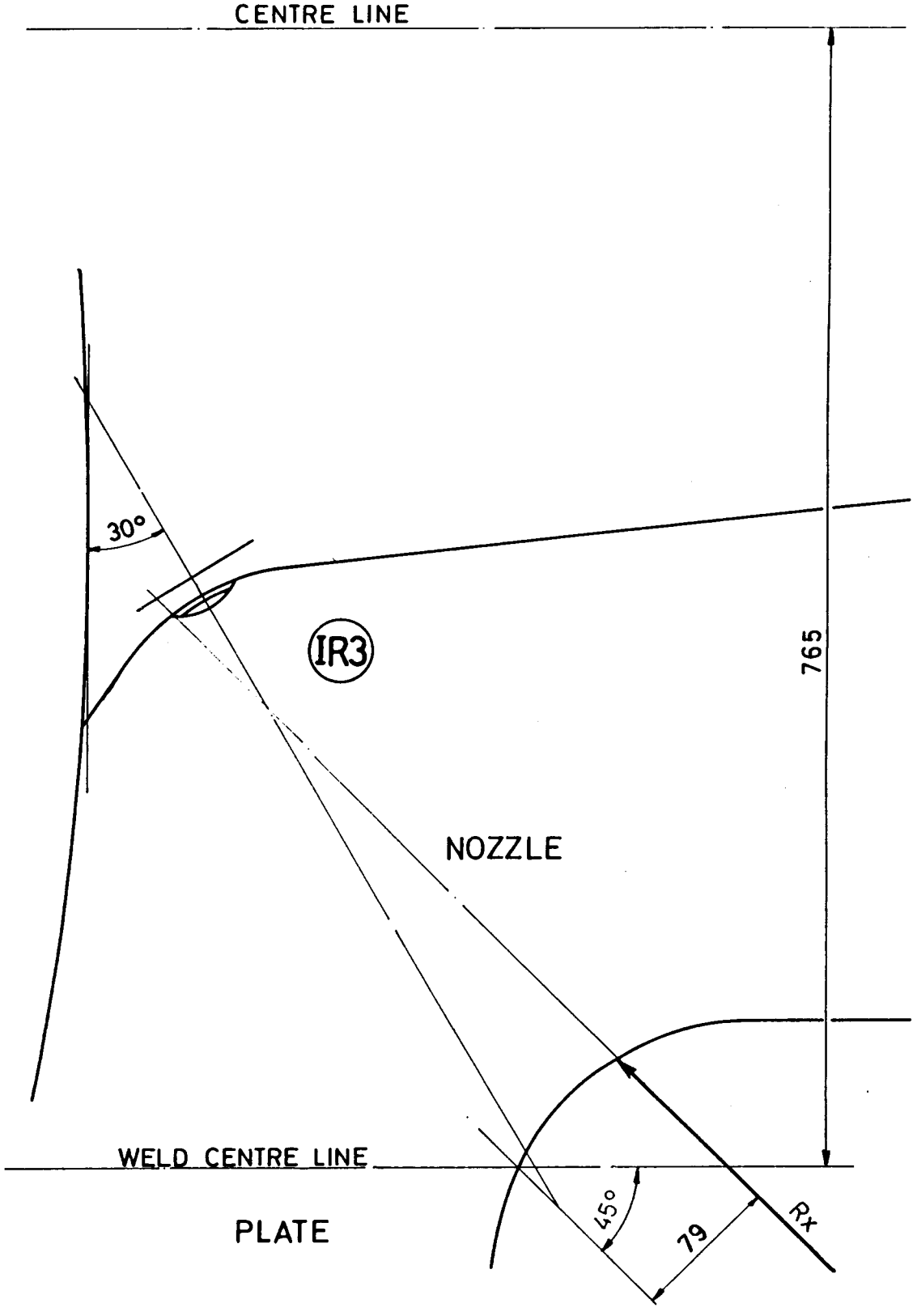




Inner radius cracks positions in Plate No. 3.

Defect		Angular position (°)	DX (mm)	DY (mm)	DZ (mm)
Plate 3	1	220	19	1,5	32,5
	2	230	16	1,5	28,5
	3	35	19	1,5	32,5

Co-ordinates of the inner radius cracks envelopes in plate No. 3.


CENTRE LINE
30°
IR3
765
NOZZLE
WELD CENTRE LINE
PLATE
45°
79
Rx

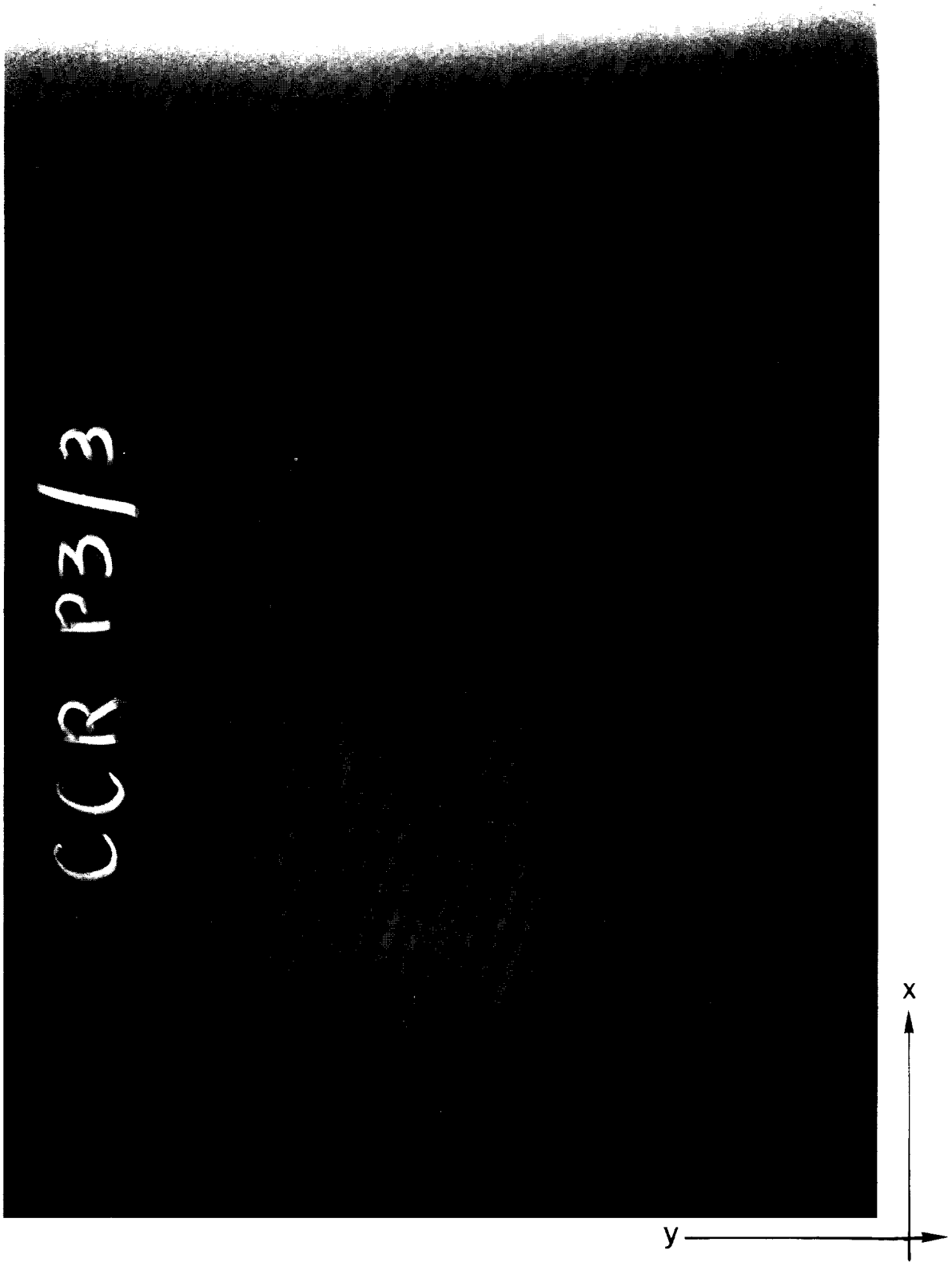



Illustration of defect No. IR 3