ORNL/TM-1999/141

RESIDUAL STRESS DETERMINATION FOR A FERRITIC STEEL WELD PLATE

D. -Q. Wang,
C. R. Hubbard
S. Spooner

Research sponsored by the Department of Energy
Assistant Secretary for Energy Efficiency
Office of Transportation Technologies
As part of the
High Temperature Materials Laboratory
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831-6064
Managed by
LOCKHEED MARTIN ENERGY RESEARCH CORP.
For the
U.S. DEPARTMENT OF ENERGY
Under contract DE-AC05-96OR22464

CONTENTS

LIST OF FIGURES.....vi
LIST OF TABLES.....v

1. OBJECTIVE.....1
2. SPECIMEN.....1
3. EXPERIMENTAL DETAILS.....1
4. RESULTS AND DISCUSSION.....3
5. CONCLUSIONS.....3

LIST OF FIGURES

Figure		Page
Fig. 1	(a) Comb-like d-zero specimen	5
	(b) 3-D schematic drawing of the weld plate and strain/stress coordinate system	5
	(c) Measurement locations at midsection	6
Fig. 2	2-Theta angle position variation at the lines in the vicinity of the weld for detector #5	7
Fig. 3	Strain distribution at the mid-thickness line	8
Fig. 4	Stress distribution at the mid-thickness line	9
Fig. 5	Normal strain distribution in the vicinity of the weld	10
Fig. 6	Normal stress distribution in the vicinity of the weld	11
Fig. 7	Transverse strain distribution in the vicinity of the weld	12
Fig. 8	Transverse stress distribution in the vicinity of the weld	13
Fig. 9	Longitudinal strain distribution in the vicinity of the weld	14
Fig. 10	Longitudinal stress distribution in the vicinity of the weld	15
Fig. 11	Measured gauge volume for detector #1	16
Fig. 12	Measured gauge volume for detector #2	17
Fig. 13	Measured gauge volume for detector #3	18
Fig. 14	Measured gauge volume for detector #4	19
Fig. 15	Measured gauge volume for detector #5	20
Fig. 16	Measured gauge volume for detector #6	21
Fig. 17	Measured gauge volume for detector #7	22

LIST OF TABLES

Table		Page
Table I.	Pertinent experimental parameters	23
Table II.	Experimental results	24
Table III.	Derived strains and stresses	54
Table IV.	Measured gauge volume size	59

1. OBJECTIVE

The primary objective of this experiment is to demonstrate the capability of neutron diffraction technique to reproducibly map residual strains in a ferritic steel weld. The objective includes the identification of corrections for variations in metal composition due to the welding process which produces changes in lattice parameter that are not due to mechanical effects.

The second objective is to develop and demonstrate a "best practice" for neutron diffraction strain mapping of steel welds. The appropriate coordinate system for the measurement of a weld, which is strongly distorted from planar geometry, has to be defined. The coordinate system is important in determining the procedures for mounting and positioning of the weld so that mapping details, especially in regions of high gradients, can be conveniently inter-compared between laboratories.

2. SPECIMEN

The specimen is one of a set of VAMAS TWA 20* round robin welds that have been circulated to the laboratories participating in this study. The weld specimens were provided by Rick Leggett of the Welding Institute (UK). The source of the round robin welds was a ferritic steel plate (type BS 4360 50D) with a size of 200x150x12.7 mm. It was flame cut from a larger sheet and the rough edges were then ground to produce reasonably smooth square edges. A 6 mm U-groove was machined in the middle of the plate along its length to a depth of 8.5 mm leaving 4 mm of parent metal below. A 12-pass mechanized TIG weld was made in the groove using a travel speed of 240 mm/min. The plate was clamped for the first 10 passes but released for the last two. The resulting distortion left the plate bend at an angle of about 7 degrees (see Fig 1). Residual stresses at transverse extremities are not necessarily close to zero and the residual stress pattern is not totally symmetrical because of flame cutting variations and restraint during welding. A 3 mm section was then cut from each weld, which provided material for the determination of the zero-stress lattice parameter. Several partial cuts into this piece formed a comb-like configuration where each "tooth" was considered stress-free.

3. EXPERIMENT DETAILS

The residual stress instrument at Oak Ridge National Laboratory is a modification of a triple-axis spectrometer located at the HB-2 beam port of the High Flux Isotope Reactor (HFIR). The reactor is a beryllium reflected, light water moderated flux-trap research reactor operating at 85 MW. The core flux is 1.5×10^{15} neutron/cm^2/sec which peaks in the beryllium reflector near the end of the radial beam tube. The monochromating crystal has a multiple-segment silicon

* Versailles Projects on Advanced Materials and Standards (VAMAS), Technical Working Group 20 (TWA-20).

construction that permits elastic bending of the segments in the horizontal plane and vertical focussing by separately orienting each elastically bent segment. The neutrons diffracted from the specimen are collected in a seven-detector array of ORDELA position-sensitive proportional counters. The detectors are mounted on a circle in the vertical plane and each detector is separated symmetrically above and below the horizontal scattering plane by 7 degrees.
The principles of residual stress measurement with neutron diffraction can be found in Ref. [1]. In the present experiment, the (331) reflection from the silicon monochromator at 84° produced a nominal monochromatic beam of 1.65 Å wavelength. The calibration procedure can be found in Ref. [2]. Five reflections from a nickel powder specimen were used to determine the wavelength. The linear detector position was calibrated against scattering angle in the following procedure. The detector arm carrying the linear position sensitive detector is moved in equal angular increments so that the 311 Ni is displaced through the range of the detector. The observed linear displacement in the peak position is then calibrated with the scattering angle. Incoherent scattering from a polyethylene plate was used to correct for variations in detector efficiency.

Incident and scattered beam apertures defined the gauge volume. The incident beam aperture opening was 1.5 mm wide and 10 mm high for normal and transverse strain measurements, 1.5 mm wide and 2 mm high for longitudinal strain measurements, at a distance of 45 mm from the rotation center of the diffractometer. The scattered beam was received through a tall aperture with a 1.5 mm width for normal and transverse strain measurements and 2 mm for longitudinal strain measurements, set at 45 mm from the diffractometer axis. The incident beam was centered over the diffractometer axis by scanning the diffracted intensity from a centered 1 mm steel pin.

The 211 Bragg reflection position from ferritic iron was used for strain measurements. The experimental parameters including the scattering geometry are summarized in Table I. Diffraction data used in this experiment were taken from the middle three detectors in the detector array. For each detector, diffraction peaks were fitted to a Gaussian curve on a background represented by a second order polynomial. Strains were calculated from the shift in the peak position relative to an appropriate stress-free standard peak position. The reported strains are the average of the strains calculated from the middle three detectors.

For each detector, the error of strain determination was estimated from the uncertainty of fitted peak position. For the average strain value (over three detectors), the root mean square deviation of strains (σ_ε^{rms}) measured by each detector, which reflects uncertainty of measurements as well as strain variations from grain to grain, was assigned as the estimated error. Typically σ_ε^{rms} is close in magnitude to the individual σ_ε values.

Two steel pillar shaped samples (6 mm x 6 mm x 40 mm and 3 mm x 6 mm x 30 mm) cut from a common sample of ferritic steel were used for intermediate scattering angle references in both welded plate and stress-free reference experiments. Scattering intensities from one or the other of these samples were recorded periodically throughout the experiment to check the stability and repeatability of peak angle measurement.

The sample positions were determined by the surface scanning technique [3-4]. Since the surfaces of the plate are not simply related to the directions of specimen translation, a program was devised to convert specimen test point coordinates to translator motor positions [5]. A selection of surface points was located in terms of motor positions by surface scans. A coordinate conversion matrix was calculated using the specimen and motor coordinates. This coordinate conversion was then used to calculate the motor positions to be used in the control program to reach the desired test points. This was particularly useful in measuring points in the stress-free "comb" where the "teeth" in the comb were not generally perpendicular to the plate surface.

4. RESULTS AND DISCUSSIONS

The experimental results for the measurements in the weld plate and comb-like sample are shown in Table II. The derived strains and stresses are listed in Table III. The measurement results for the comb-like specimen are plotted in Fig. 2. It can be seen that the strain-free lattice parameter at points close to the front surface varies with distance from the front surface. The variation is due to small composition gradients. The average of the peak position from the measurements at line 1 and 7 in Fig. 2 indicates that the peak shift due to computation gradient is not large (0.03 degrees). The residual strains and stresses at the mid-thickness line are plotted in Fig. 3 and Fig. 4, respectively. Note that the longitudinal stress is tensile and the transverse stresses compressive at the mid-thickness line in the vicinity of the weld. At one end (~60 mm from reference line), the residual stresses in all directions tend to be zero while at the other end they are tensile. In all cases the normal stresses are relatively small. The distribution of the residual stresses at the mid-thickness line is not symmetric with respect to the centerline. The residual strain and stress maps at locations on the lines in the vicinity of the weld (line 2 - line 6) are shown in Fig. 5 - Fig. 10.

The distribution of scattering intensity from a 0.5 mm diameter pin that was scanned over a 3 mm by 2 mm area on the horizontal plane is shown in Figure [11-17]. The figure indicates good correspondence to the dimensions of the defining slits. The centering of the gauge volume to the diffractometer rotation axis is shown as well. The scanning measurements for the gauge volume indicate that the gauge volume was elongated along the incident beam. The comparison of the gauge volume size for individual detectors is listed in Table IV. The gauge volume size is calculated by measuring the size of the contour in which the intensity is larger than 50%.

5. CONCLUSIONS

- The strain and stress distribution at the mid-thickness line is not symmetric with respect to the centerline.
- The lattice parameter of the d-zero sample in the area near the front surface varies due to chemical compositional gradients.
- Compared with the measurement for the ring & plug, the residual stress measurement for this round robin specimen is more challenging in terms of data interpretation and accurate sample location.

ACKNOWLEDGEMENT

Research sponsored by the Assistant Secretary for Energy Efficiency and Renewable Energy, Office of Transportation Technologies, as part of the High Temperature Materials Laboratory User Program, Oak Ridge National Laboratory, managed by Lockheed Martin Energy Research Corp. for the U.S. Department of Energy under contract number DE-AC05-96OR22464. DQW was supported in part by an appointment to the Oak Ridge National Laboratory Postdoctoral Research Associates Program administrated jointly by the Oak Ridge National Laboratory and the Oak Ridge Institute for Science and Education.

REFERENCES

1. A. Allen, C. Andreani, M. T. Hutchings, and C. G. Windsor, "Measurement of Internal Stress Within Bulk Materials Using Neutron Diffraction", NTD International (October), 249-254(1981)
2. X. Zhu and C. R. Hubbard, "A Calibration Procedure for Position Sensitive Detectors Used in Neutron Residual Strain Mapping", Advances in X-ray Analysis, **40**, 604-611, (1997)
3. P. C. Brand and H. J. Prask, "New Methods for the Alignment of Instrumentation for Residual Stress Measurements by Means of Neutron Diffraction", *J. App. Cryst.,* 27, 164-176 (1994)
4. D.Q.Wang and L.Edward, "Precise determination of specimen surface position during sub-surface strain scanning by neutron diffraction", Proc. of Fourth European Conference on Residual Stresses, p135-143, France, 1996
5. D.-Q. Wang, C.R. Hubbard and S. Spooner, "Application of 2-Dimensional coordinate system conversion in stress measurements with neutron diffraction", HTML report, ORNL 1999

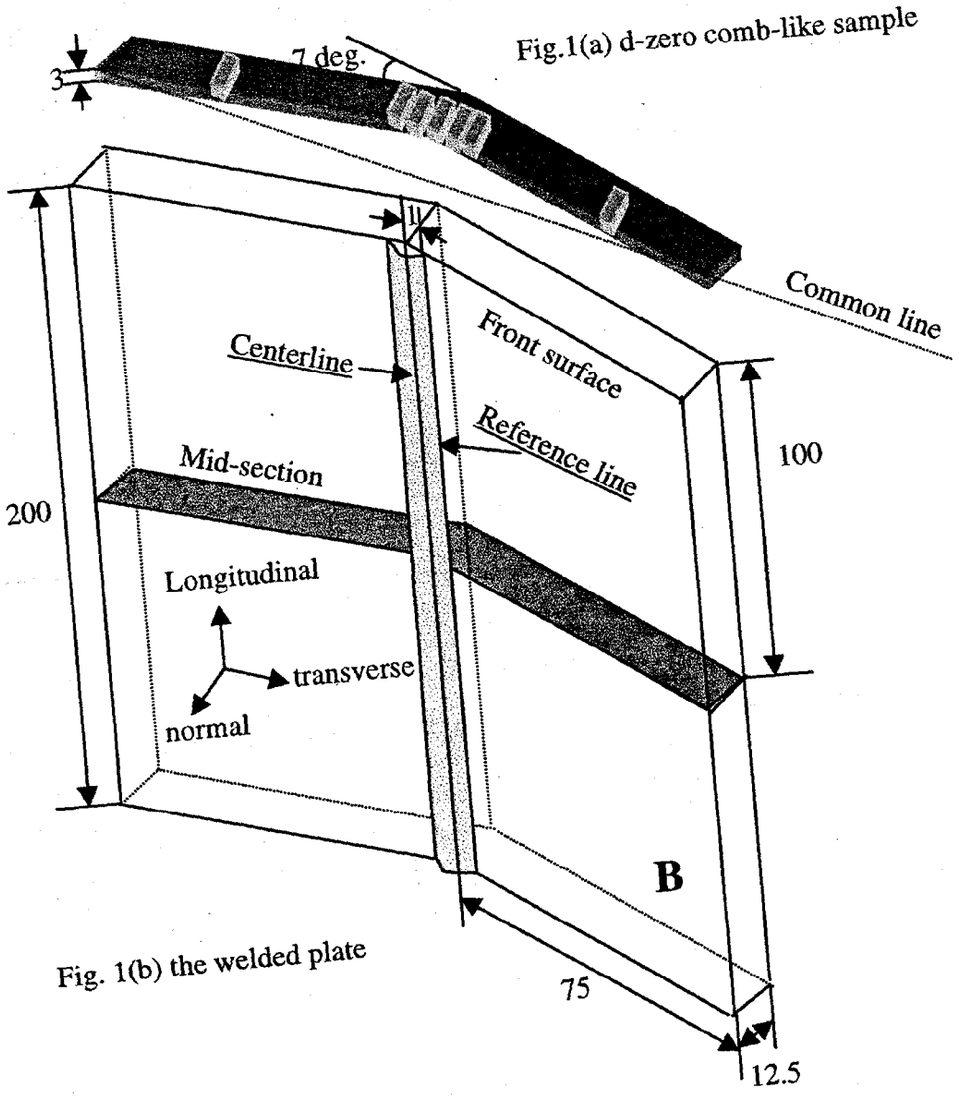

Fig. 1 Schematic drawing of the plate (not to scale). All units are in mm.

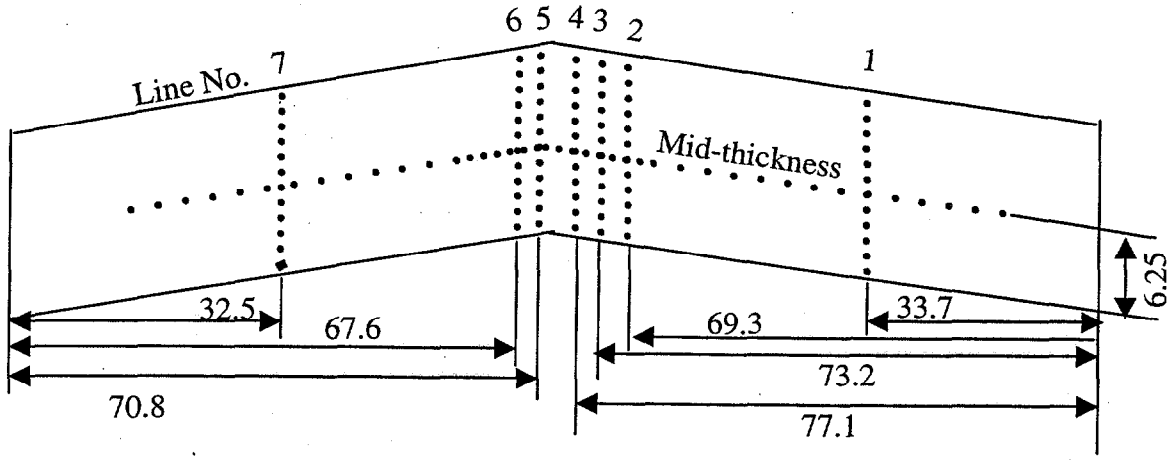

Fig. 1(c) Measurement locations in the mid-section of the plate

Fig.2 Measured two-theta variation within the comb-like sample at the lines in the vicinity of the weld

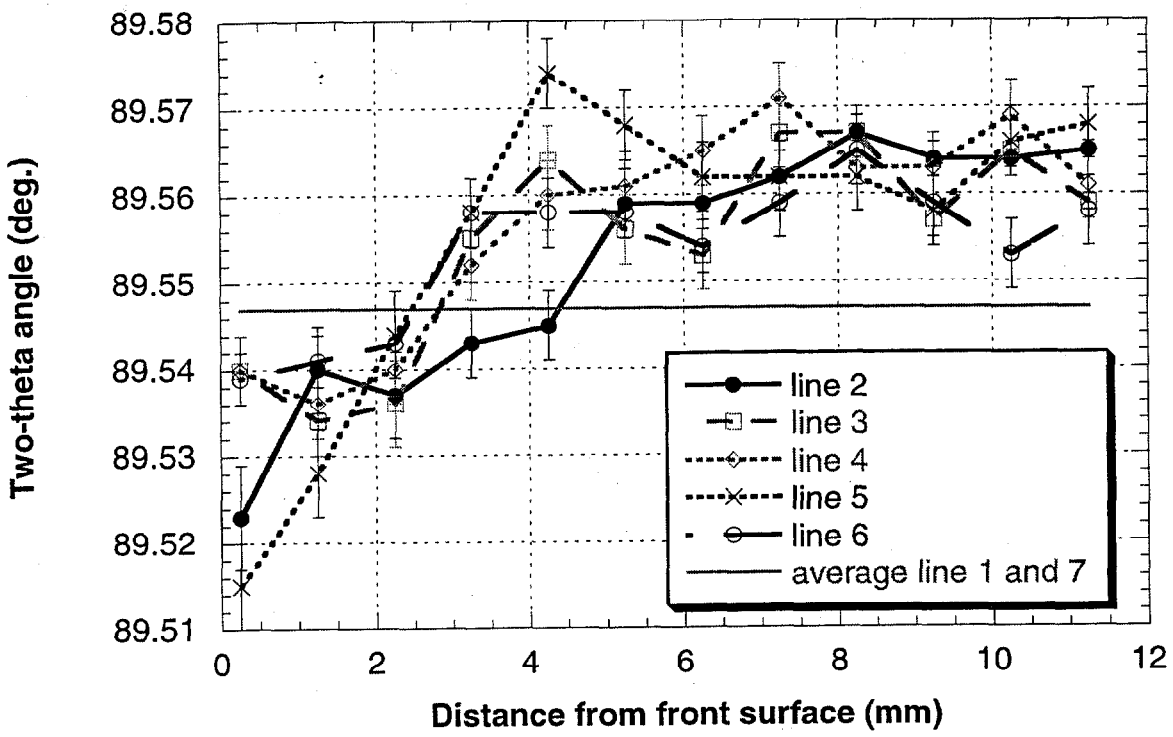

Fig. 3 Residual Strain Distribution at the mid-thickness line

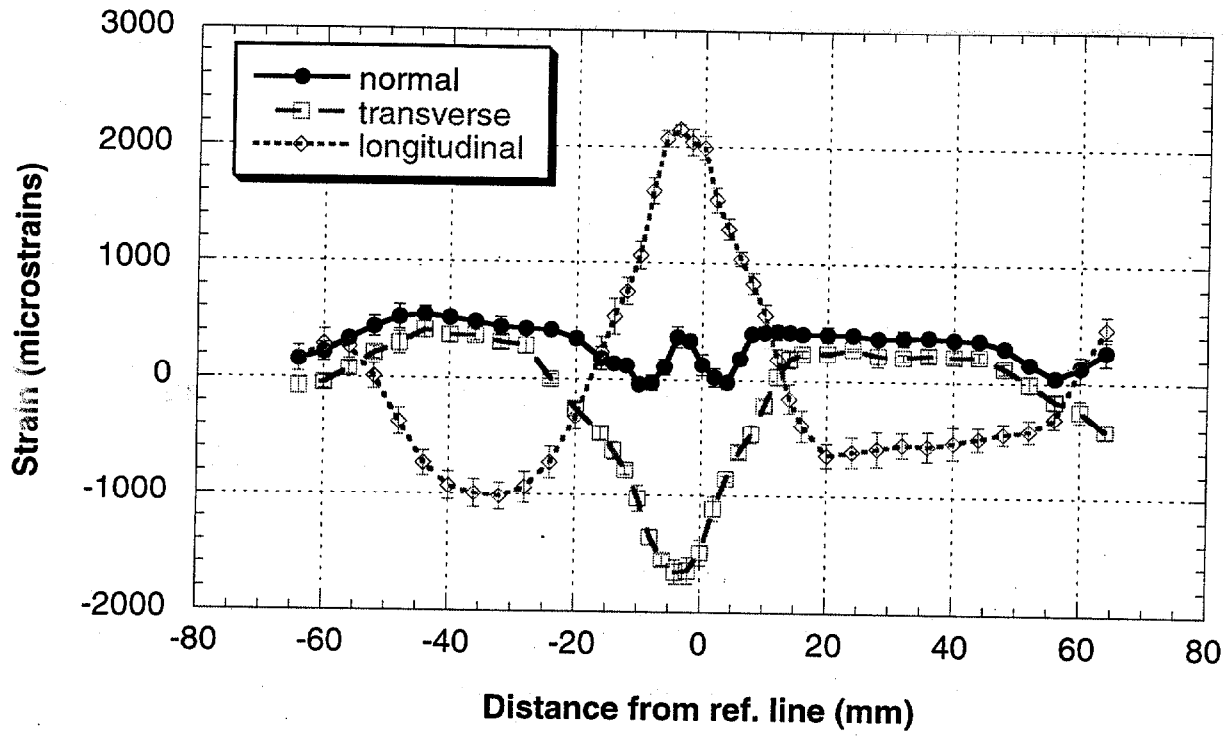

Fig. 4 Stress Distribution at the Mid-thickness Line

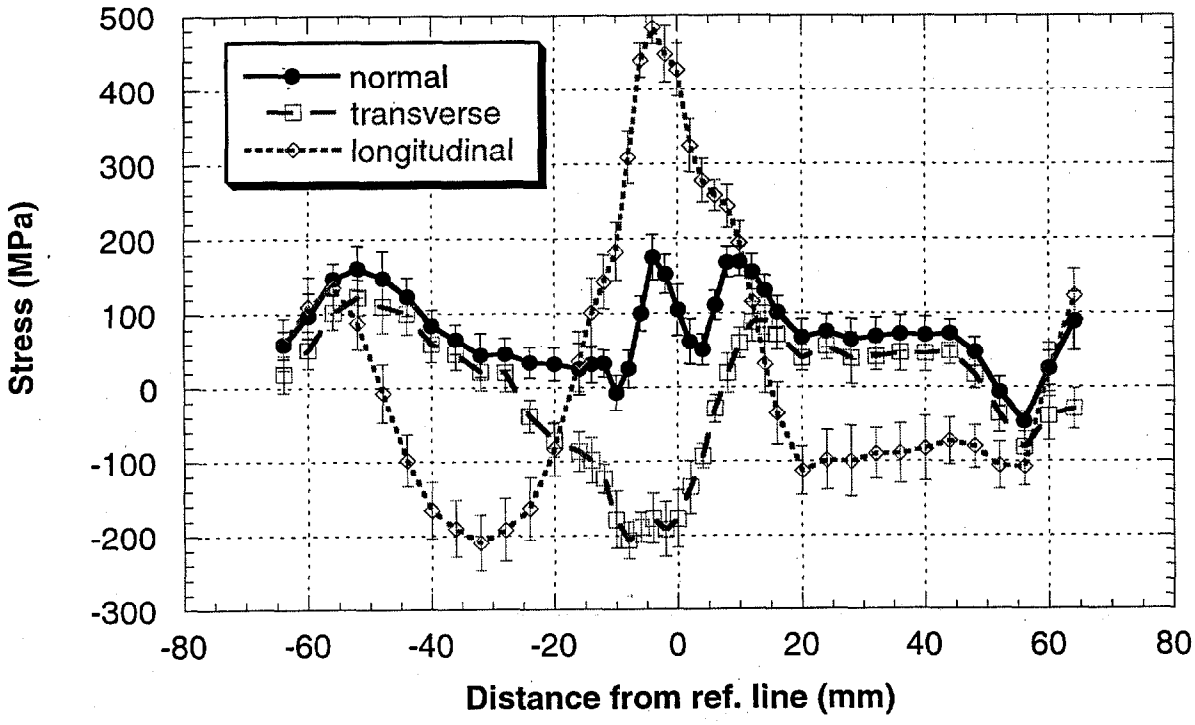

Fig. 6 Normal Stress Distribution in the Vicinity of the Weld

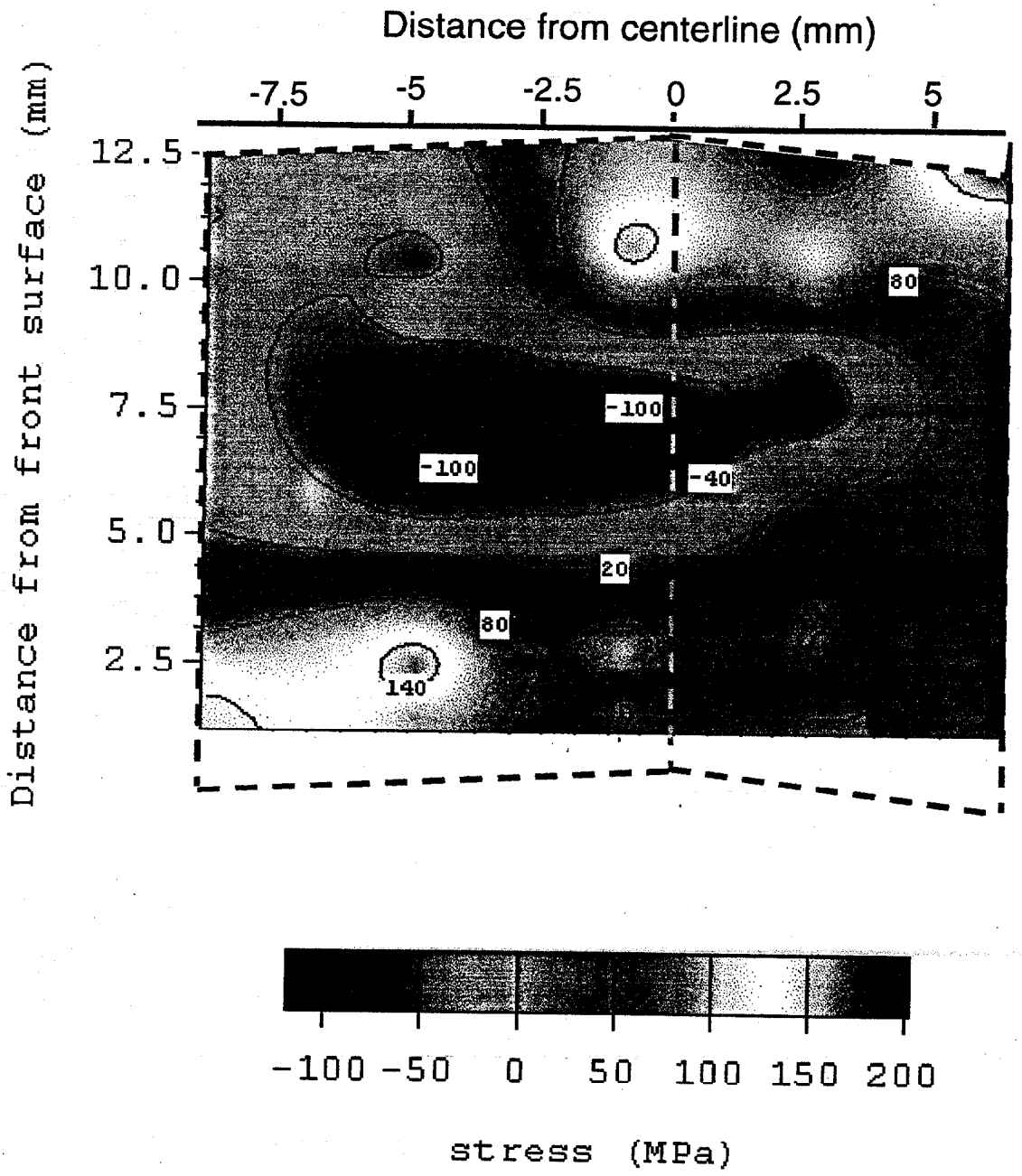

Fig. 7 Transverse Strain Distribution in the Vicinity of the Weld

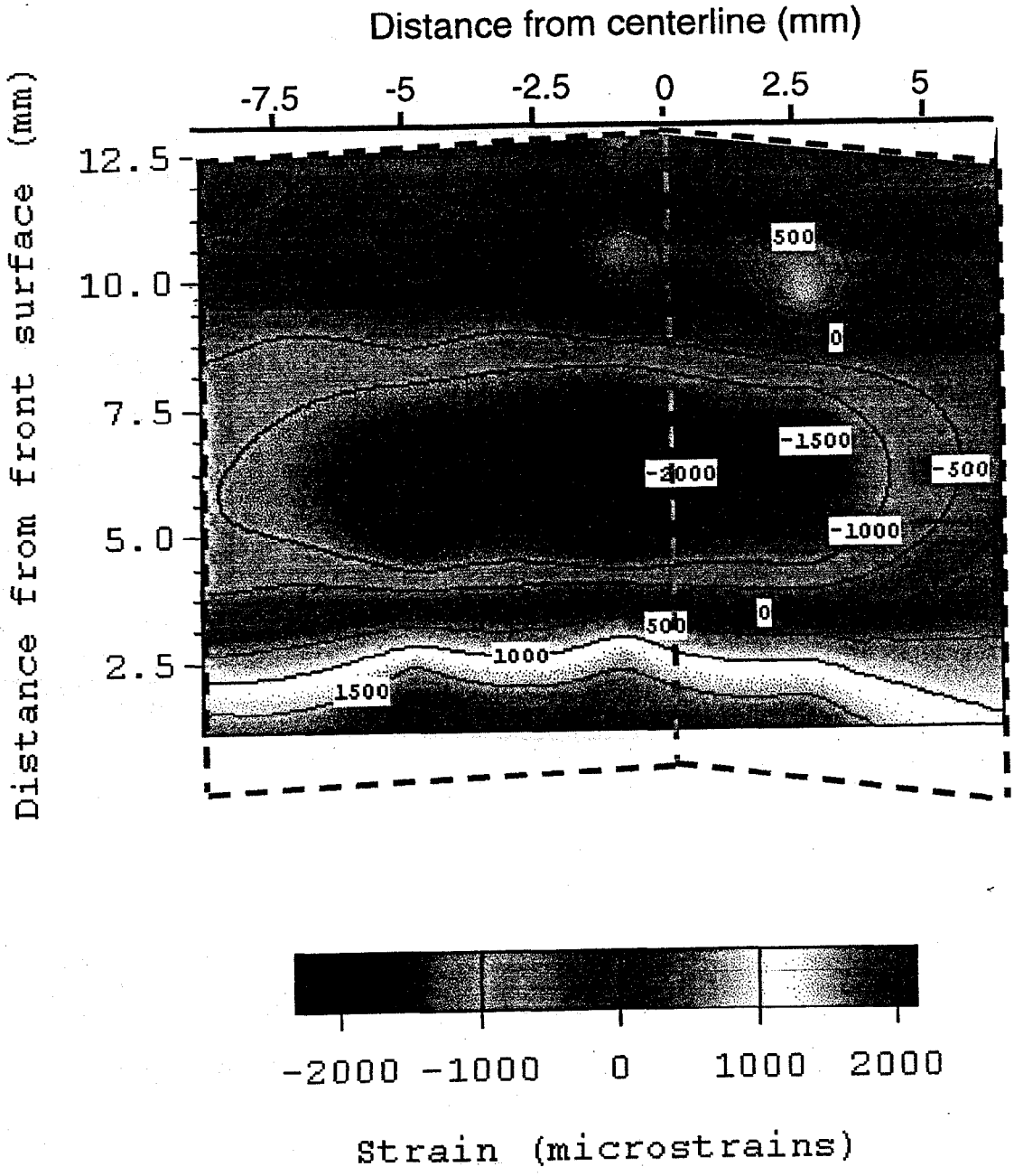

Fig. 8 Transverse Stress Distribution in the Vicinity of the Weld

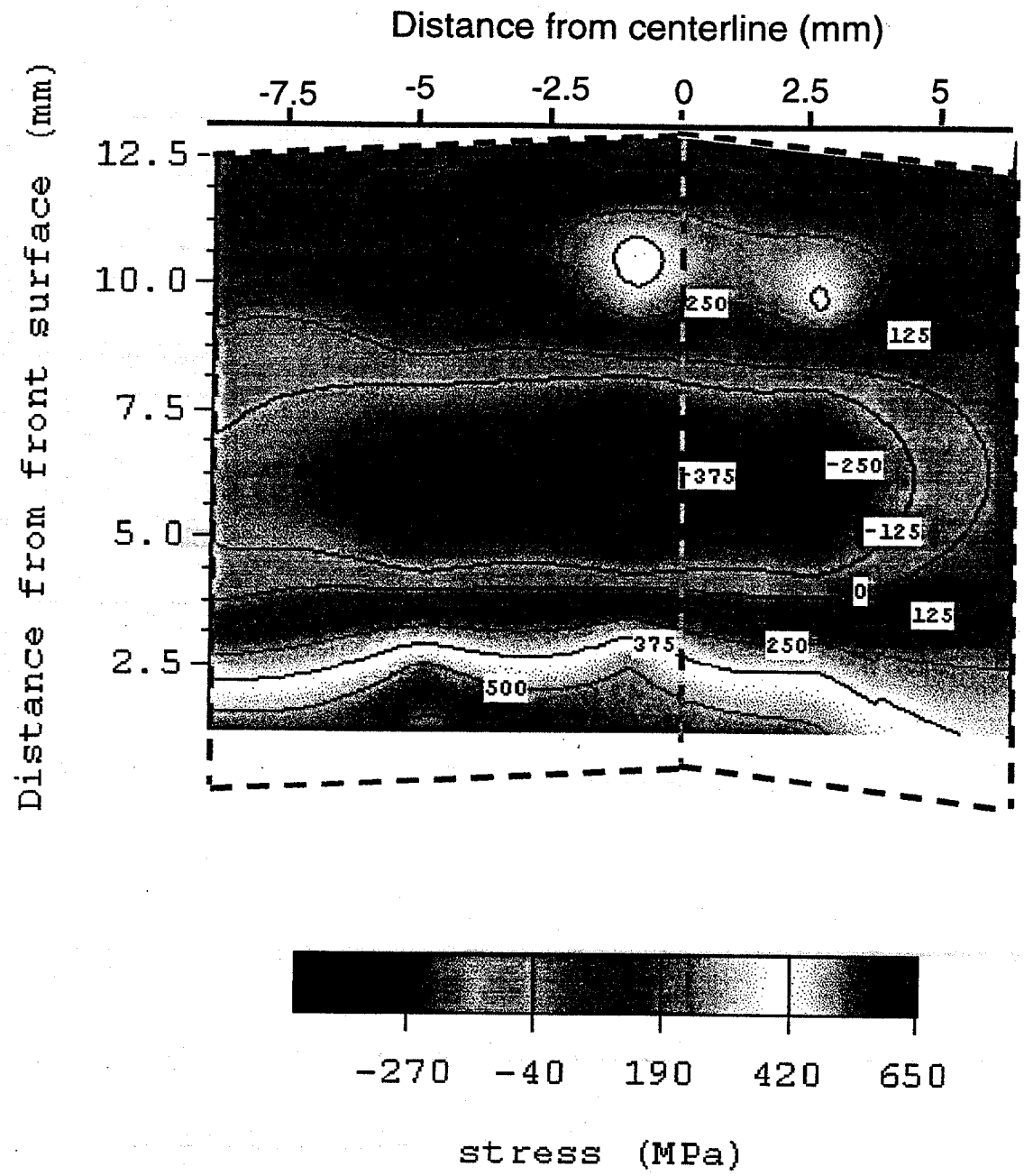

Fig. 9 Longitudinal Strain Distribution in the Vicinity of the Weld

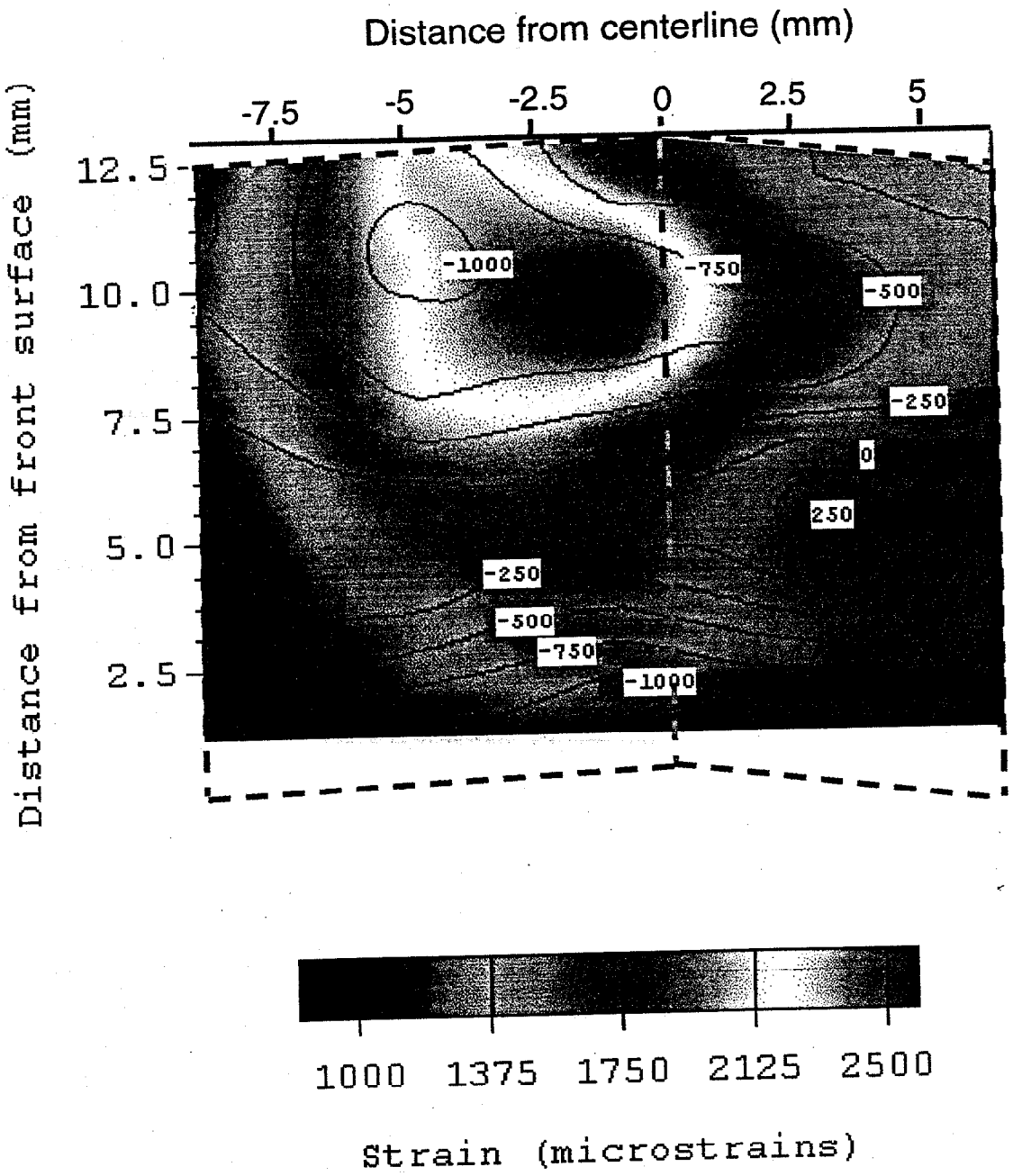

Fig. 10 Longitudinal Stress Distribution in the Vicinity of the Weld

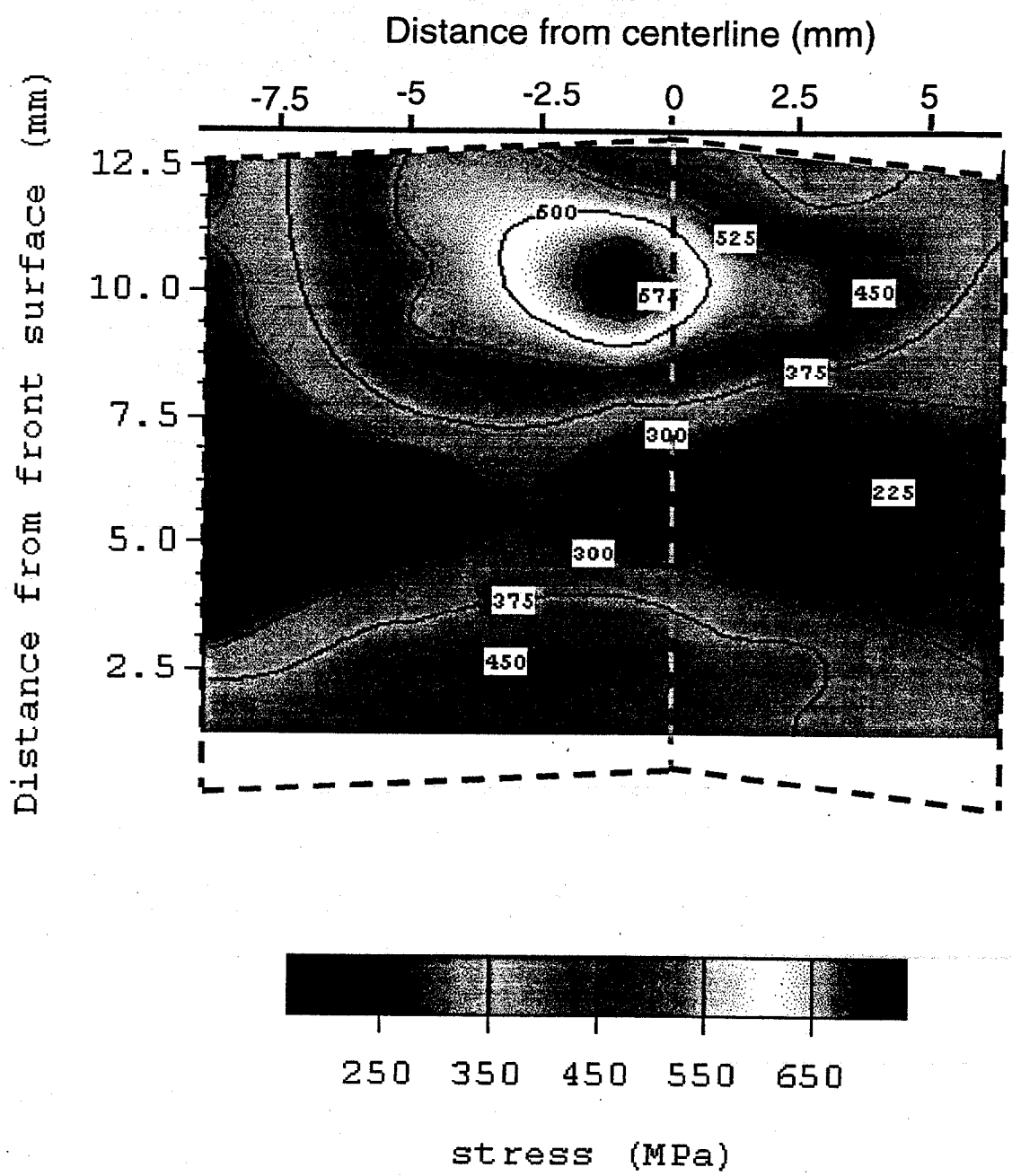

Fig. 11 Gauge volume of detector #1

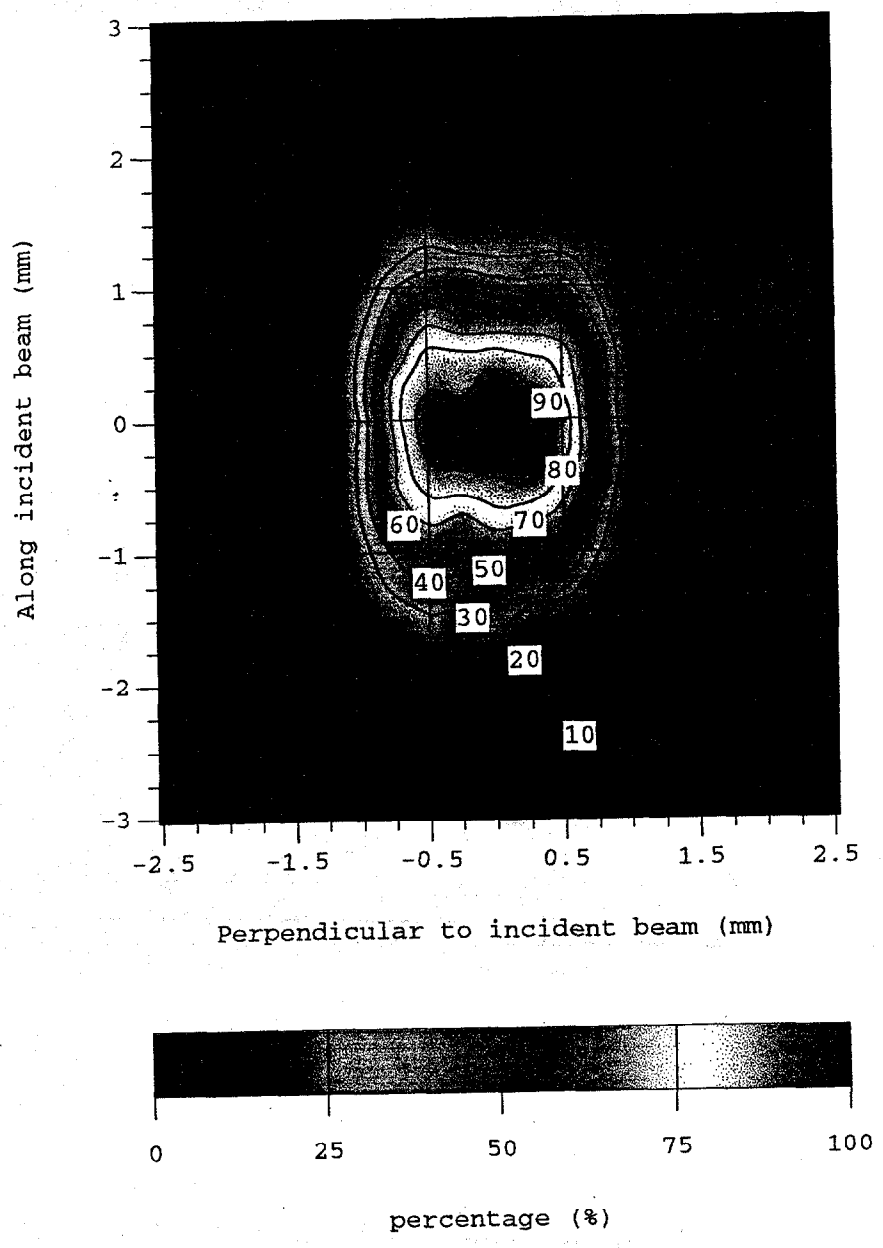

Fig. 12 Gauge volume of detector #2

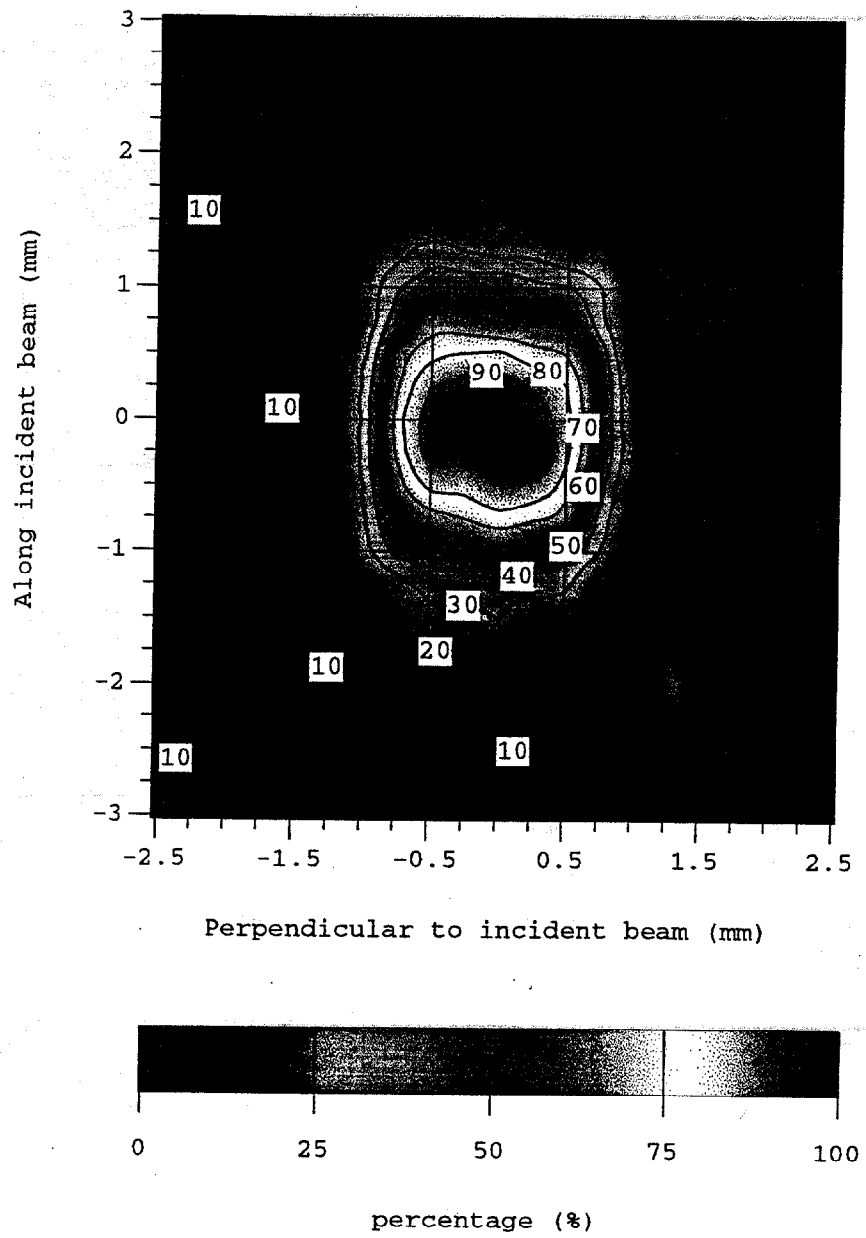

Fig. 13 Gauge volume of detector #3

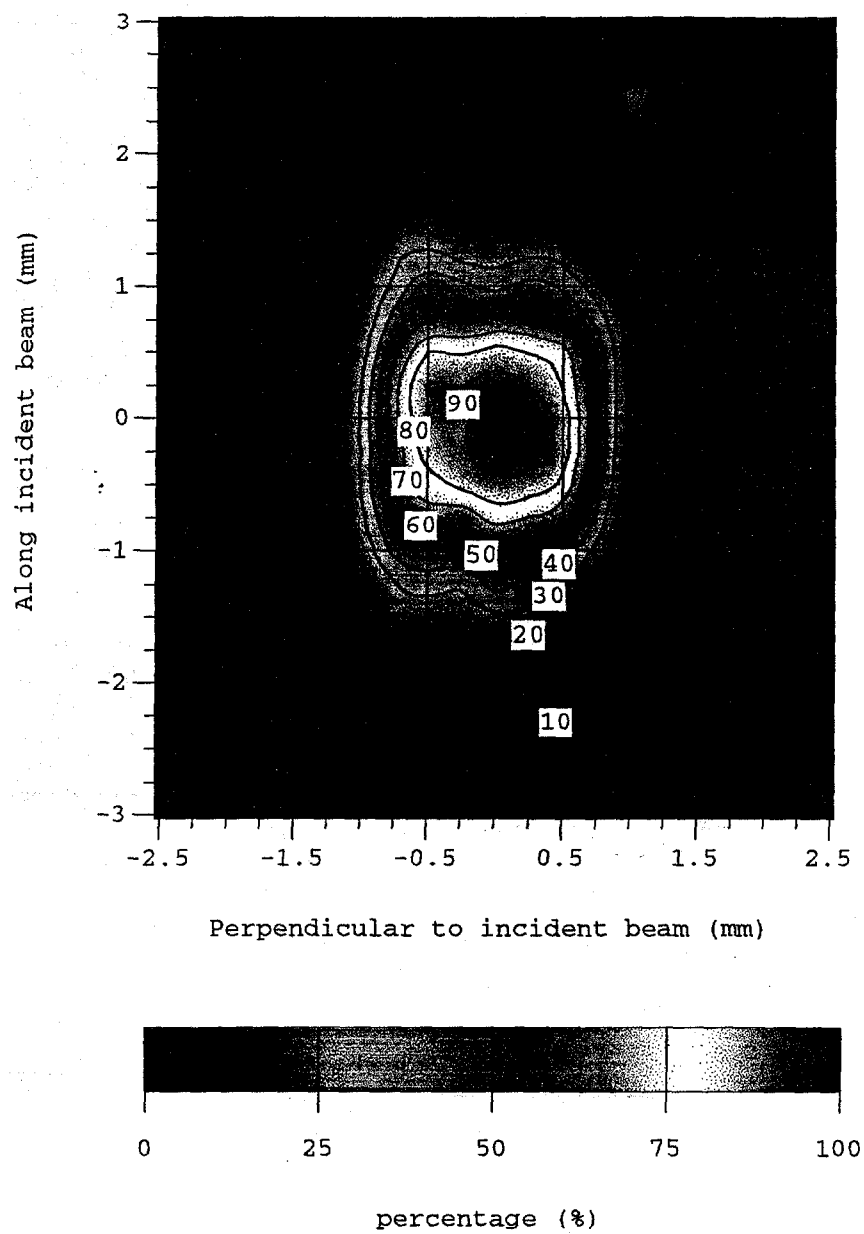

Fig. 14 Gauge volume of detector #4

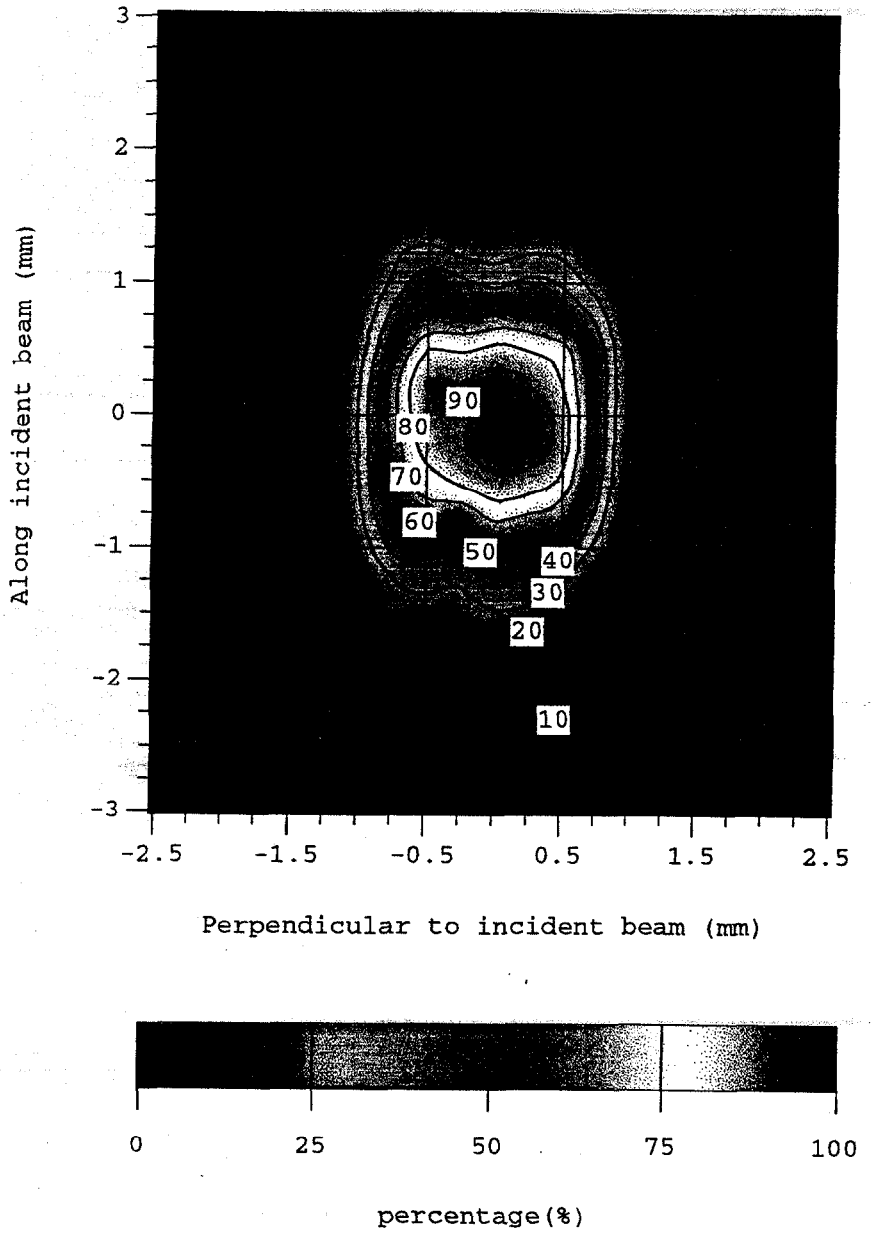

Fig. 15 Gauge volume of detector #5

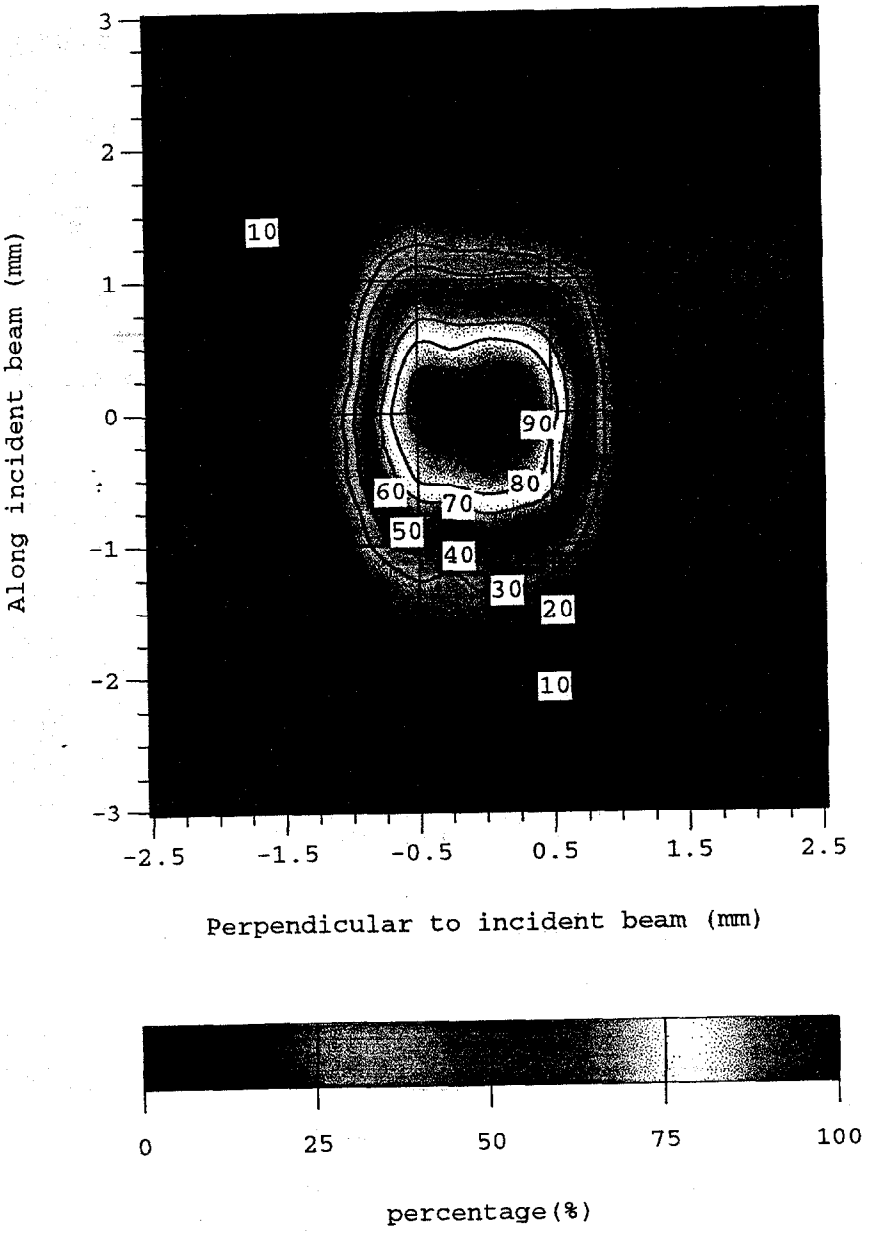

Fig. 16 Gauge volume of detector #6

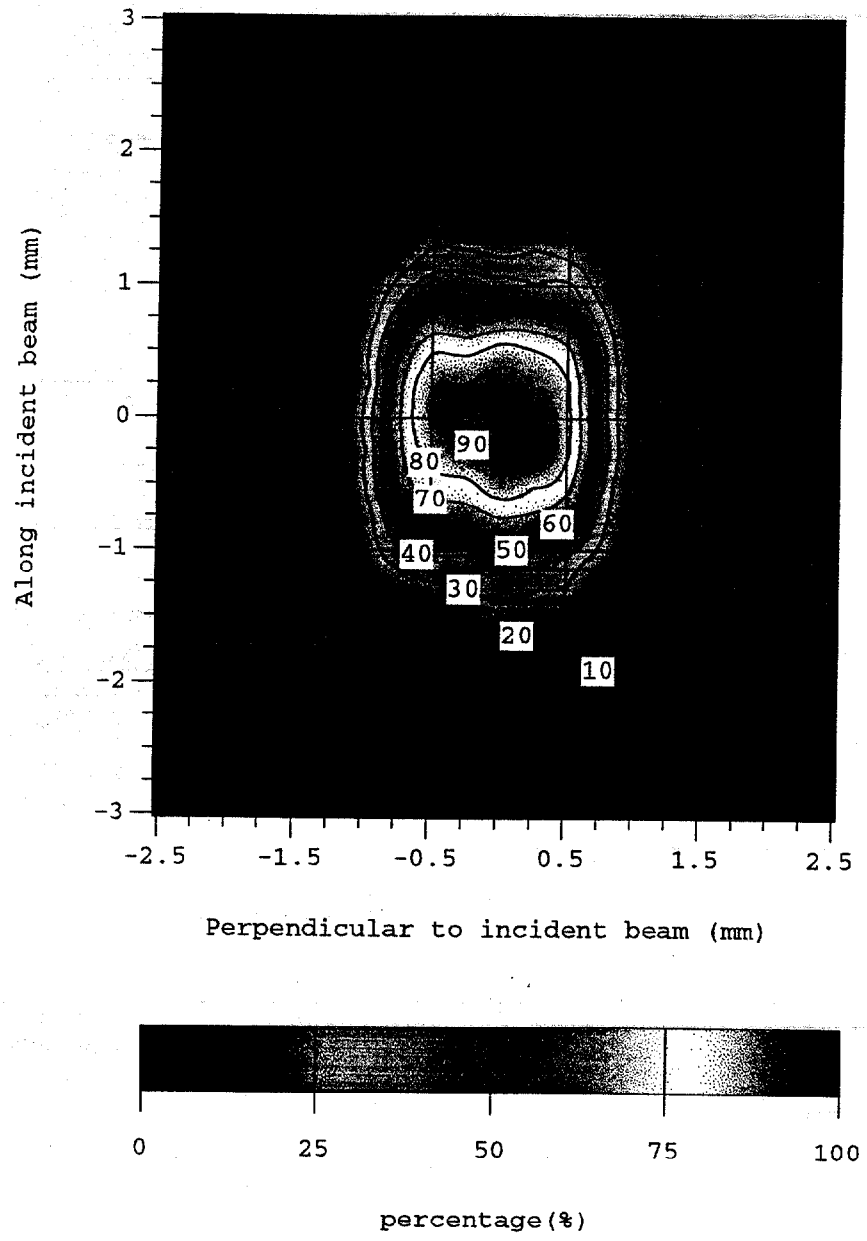

Fig. 17 Gauge volume of detector #7

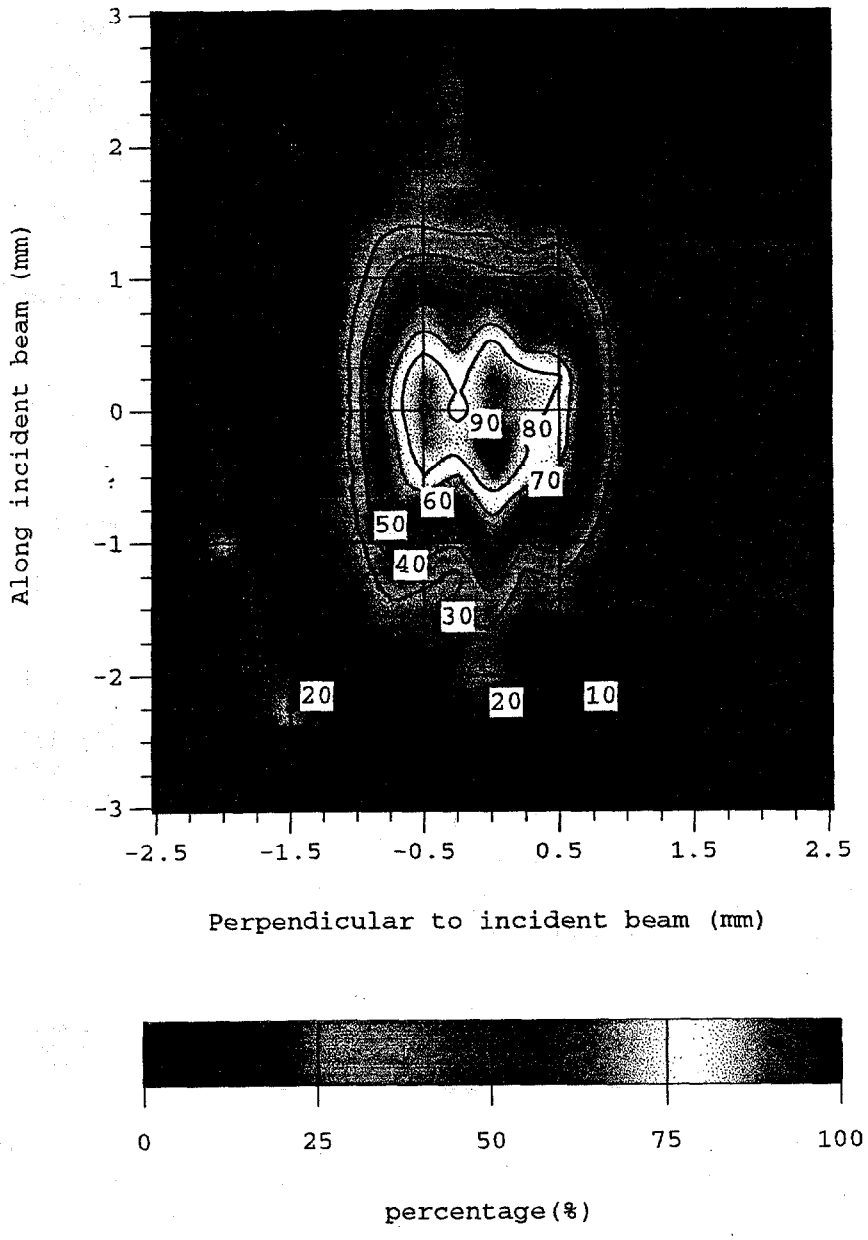

Table I Experimental Parameters Used in the VAMAS TWA-20 Experiment

Double focusing monochromator [Si (331) reflection]		
Take-off-angle	84°	
Neutron wavelength	1.65	Å
Sample [Ferritic steel (211) reflection]		
Diffraction angle	~89°	
Lattice spacing	~1.166	Å
Geometric parameters		
Neutron source-to-monochromator	7150	mm
Monochromator-to-diffractometer axis	1750	mm
Detector-to-diffractometer axis	800	mm
Divergence of in-pile collimator	0.09°	
Incident beam slit-to-diffractometer axis		
for normal and transverse strain measurement	50	mm
for longitudinal strain measurement	100	mm
Diffracted beam slit-to-diffractometer axis		
for normal and transverse strain measurement	35	mm
for longitudinal strain measurement	45	mm
Incident slit height for normal and transverse strain measurements	10	mm
Incident slit height for longitudinal strain measurements	1.5	mm
Incident slit width for normal and transverse strain measurements	1.5	mm
Incident slit width for longitudinal strain measurements	2	mm
Detector slit height	25	mm
Sampling volume for normal and transverse strain measurements	~22.5	mm^3
Sampling volume for longitudinal strain measurements	~6	mm^3

Table II. Experimental results

Detector #3

Ferritic Steel Weld Plate

direction	Position (mm)	2Θ / d / a [° / A]	uncertainty	FWHM [°]	uncertainty [°]	Peak Height	uncertainty	sampling time (min.)
normal	0.25	89.514	0.006	0.361	0.015	92.453	3.72	18
normal	1.25	89.538	0.005	0.384	0.011	135.37	3.96	15
normal	2.25	89.541	0.004	0.35	0.01	120.01	3.767	10
normal	3.25	89.532	0.004	0.362	0.008	151.36	4.008	9
normal	4.25	89.538	0.004	0.351	0.008	147.58	3.915	6
normal	5.25	89.552	0.004	0.35	0.009	100.37	3.161	3
normal	6.25	89.543	0.003	0.357	0.006	197.9	4.293	4
normal	7.25	89.542	0.002	0.366	0.004	401.77	5.992	6
normal	8.25	89.54	0.001	0.367	0.003	793.13	8.362	9
normal	9.25	89.539	0.001	0.357	0.002	1220.8	10.432	10
normal	10.25	89.538	0.001	0.364	0.002	2397.2	14.348	15
normal	11.25	89.536	0.001	0.359	0.001	3762.5	18.025	18
normal	0.25	89.606	0.006	0.377	0.014	93.696	3.613	18
normal	1.25	89.615	0.005	0.39	0.01	137.36	3.958	15
normal	2.25	89.612	0.004	0.383	0.01	126.98	3.703	10
normal	3.25	89.606	0.004	0.373	0.008	164.13	4.09	9
normal	4.25	89.599	0.004	0.374	0.008	146.31	3.806	6
normal	5.25	89.588	0.004	0.396	0.009	96.943	43.11	3
normal	6.25	89.564	0.003	0.387	0.007	183.14	175.157	4
normal	7.25	89.564	0.002	0.378	0.004	390.42	5.843	6
normal	8.25	89.563	0.001	0.378	0.003	759.66	8.111	9
normal	9.25	89.579	0.001	0.373	0.002	1171	10.028	10
normal	10.25	89.603	0.001	0.373	0.002	2329.5	14.026	15
normal	11.25	89.63	0.001	0.374	0.001	3711.2	17.59	18
normal	0.25	89.662	0.009	0.502	0.021	73.228	2.97	18
normal	1.25	89.673	0.007	0.583	0.017	98.531	2.922	15
normal	2.25	89.682	0.008	0.643	0.019	79.799	2.42	10
normal	3.25	89.673	0.005	0.496	0.012	120.1	3.191	9
normal	4.25	89.657	0.004	0.425	0.01	130.55	3.396	6
normal	5.25	89.637	0.005	0.453	0.012	85.319	2.611	3
normal	6.25	89.599	0.004	0.445	0.008	159.76	3.569	4
normal	7.25	89.572	0.002	0.438	0.005	342.36	5.172	6
normal	8.25	89.574	0.002	0.42	0.003	694.99	7.402	9
normal	9.25	89.589	0.001	0.409	0.003	1070.2	9.245	10
normal	10.25	89.633	0.001	0.406	0.002	2136.4	12.947	15
normal	11.25	89.666	0.001	0.398	0.001	3405.7	16.457	18
normal	0.25	89.575	0.009	0.651	0.022	85.39	2.744	18
normal	1.25	89.596	0.008	0.651	0.018	98.549	2.775	15
normal	2.25	89.644	0.006	0.512	0.013	106.08	3	10
normal	3.25	89.665	0.004	0.429	0.009	156.24	3.767	9
normal	4.25	89.649	0.004	0.447	0.009	143.17	3.47	6
normal	5.25	89.623	0.005	0.441	0.011	89.138	2.723	3
normal	6.25	89.598	0.004	0.457	0.008	152.62	3.434	4
normal	7.25	89.552	0.003	0.499	0.006	297.41	4.545	6

normal	8.25	89.555	0.002	0.504	0.004	566.487	6.199	9
normal	9.25	89.604	0.002	0.473	0.003	904.359	7.968	10
normal	10.25	89.654	0.001	0.431	0.002	2017.597	12.298	15
normal	11.25	89.685	0.001	0.426	0.002	3128.601	15.258	18
normal	0.25	89.568	0.01	0.67	0.023	79.223	2.626	18
normal	1.25	89.589	0.008	0.671	0.02	89.656	2.658	15
normal	2.25	89.619	0.007	0.598	0.018	87.905	2.652	10
normal	3.25	89.66	0.005	0.471	0.01	140.528	3.456	9
normal	4.25	89.662	0.004	0.456	0.01	136.871	3.366	6
normal	5.25	89.609	0.006	0.488	0.012	86.494	2.56	3
normal	6.25	89.542	0.004	0.481	0.008	160.347	3.43	4
normal	7.25	89.528	0.003	0.481	0.006	318.906	4.769	6
normal	8.25	89.532	0.002	0.478	0.004	627.442	6.707	9
normal	9.25	89.574	0.001	0.44	0.003	999.923	8.646	10
normal	10.25	89.631	0.001	0.422	0.002	2116.614	12.68	15
normal	11.25	89.672	0.001	0.417	0.001	3321.073	15.859	18
normal	0.25	89.539	0.007	0.443	0.017	91.835	3.42	18
normal	1.25	89.576	0.004	0.386	0.01	144.835	4.098	15
normal	2.25	89.601	0.004	0.374	0.009	139.545	3.888	10
normal	3.25	89.634	0.004	0.384	0.008	165.105	4.08	9
normal	4.25	89.633	0.004	0.406	0.008	151.002	3.7	6
normal	5.25	89.606	0.004	0.4	0.009	104.083	3.014	3
normal	6.25	89.582	0.003	0.389	0.007	190.517	4.12	4
normal	7.25	89.567	0.002	0.388	0.004	395.773	5.824	6
normal	8.25	89.56	0.001	0.391	0.003	779.639	8.065	9
normal	9.25	89.575	0.001	0.387	0.002	1152.7	9.773	10
normal	10.25	89.61	0.001	0.388	0.002	2218.919	13.487	15
normal	11.25	89.643	0.001	0.393	0.001	3456.674	16.617	18
normal	0.25	89.55	0.026	0.384	0.062	5.122	0.816	1
normal	1.25	89.52	0.015	0.316	0.033	9.263	1.073	1
normal	2.25	89.54	0.012	0.393	0.032	20.84	1.397	1.5
normal	3.25	89.526	0.009	0.356	0.018	27.128	1.669	1.5
normal	4.25	89.539	0.006	0.354	0.013	53.398	2.301	2
normal	5.25	89.545	0.004	0.369	0.009	105.912	3.133	3
normal	6.25	89.543	0.003	0.364	0.006	195.021	4.232	4
normal	7.25	89.546	0.002	0.355	0.004	392.683	6.038	6
normal	8.25	89.54	0.001	0.36	0.003	801.217	8.469	9
normal	9.25	89.542	0.001	0.358	0.002	1217.958	10.409	10
normal	10.25	89.541	0.001	0.361	0.002	2418.092	14.458	15
normal	11.25	89.533	0.001	0.361	0.001	3861.869	18.227	18
normal	-64	89.537	0.003	0.359	0.006	204.218	4.377	4
normal	-60	89.533	0.003	0.359	0.006	210.908	4.446	4
normal	-56	89.521	0.003	0.359	0.006	207.112	4.389	4
normal	-52	89.508	0.003	0.361	0.006	216.184	4.484	4
normal	-48	89.491	0.003	0.362	0.006	208.974	4.385	4
normal	-44	89.49	0.003	0.36	0.006	211.028	4.429	4
normal	-40	89.495	0.003	0.358	0.006	214.724	4.473	4
normal	-36	89.502	0.003	0.356	0.006	217.652	4.546	4
normal	-32	89.497	0.003	0.352	0.006	217.504	4.564	4
normal	-28	89.508	0.003	0.37	0.006	214.766	4.399	4
normal	-24	89.506	0.003	0.353	0.006	214.313	4.524	4
normal	-20	89.508	0.003	0.364	0.006	214.429	4.43	4

normal	-16	89.514	0.003	0.362	0.006	210.306	4.42	4
normal	-14	89.534	0.003	0.351	0.006	215.729	4.533	4
normal	-12	89.541	0.003	0.365	0.006	212.504	4.475	4
normal	-10	89.542	0.003	0.398	0.007	197.053	4.109	4
normal	-8	89.556	0.004	0.458	0.008	173.728	3.626	4
normal	-6	89.554	0.004	0.482	0.008	170.351	3.502	4
normal	-4	89.536	0.004	0.478	0.008	160.275	3.444	4
normal	-2	89.512	0.004	0.503	0.008	177.321	3.498	4
normal	0	89.51	0.004	0.466	0.008	183.486	3.691	4
normal	2	89.535	0.003	0.396	0.006	206.73	4.22	4
normal	4	89.55	0.003	0.371	0.006	218.803	4.462	4
normal	6	89.555	0.003	0.368	0.006	224.111	4.514	4
normal	8	89.533	0.003	0.366	0.006	223.198	4.515	4
normal	10	89.509	0.003	0.355	0.006	221.888	4.566	4
normal	12	89.506	0.003	0.363	0.006	226.642	4.545	4
normal	14	89.509	0.003	0.365	0.006	222.615	4.517	4
normal	16	89.508	0.003	0.353	0.006	223.803	4.614	4
normal	20	89.508	0.003	0.356	0.006	228.117	4.607	4
normal	24	89.507	0.003	0.367	0.006	212.061	4.372	4
normal	28	89.511	0.003	0.352	0.006	223.251	4.568	4
normal	32	89.512	0.003	0.36	0.006	210.016	4.438	4
normal	36	89.51	0.003	0.357	0.006	220.942	4.537	4
normal	40	89.512	0.003	0.356	0.006	217.153	4.506	4
normal	44	89.515	0.003	0.353	0.006	222.247	4.54	4
normal	48	89.513	0.003	0.356	0.006	214.251	4.441	4
normal	52	89.528	0.003	0.361	0.006	212.529	4.444	4
normal	56	89.549	0.003	0.344	0.006	223.333	4.659	4
normal	60	89.555	0.003	0.364	0.006	212.129	4.426	4
normal	64	89.515	0.002	0.373	0.004	343.011	5.432	4
transverse	0.25	89.521	0.003	0.359	0.007	176.707	4.1	5
transverse	1.25	89.517	0.003	0.344	0.006	192.169	4.358	5
transverse	2.25	89.523	0.003	0.349	0.006	199.187	4.43	5
transverse	3.25	89.518	0.003	0.354	0.006	206.38	4.441	5
transverse	4.25	89.517	0.003	0.358	0.006	203.301	4.448	5
transverse	5.25	89.519	0.003	0.355	0.006	212.837	4.545	5
transverse	6.25	89.523	0.003	0.362	0.006	219.366	4.549	5
transverse	7.25	89.522	0.003	0.355	0.006	231.879	4.688	5
transverse	8.25	89.509	0.003	0.343	0.006	238.316	4.841	5
transverse	9.25	89.512	0.003	0.361	0.006	232.226	4.607	5
transverse	10.25	89.514	0.003	0.363	0.005	244.642	4.73	5
transverse	11.25	89.52	0.004	0.39	0.008	130.391	3.454	5
transverse	0.25	89.532	0.004	0.461	0.009	146.873	3.395	5
transverse	1.25	89.55	0.004	0.415	0.008	166.985	3.785	5
transverse	2.25	89.566	0.003	0.391	0.007	186.063	4.057	5
transverse	3.25	89.586	0.003	0.406	0.007	187.441	3.981	5
transverse	4.25	89.611	0.003	0.405	0.007	182.741	3.963	5
transverse	5.25	89.652	0.003	0.411	0.007	173.231	3.85	5
transverse	6.25	89.678	0.003	0.408	0.007	174.059	3.877	5
transverse	7.25	89.673	0.003	0.404	0.007	173.093	3.886	5
transverse	8.25	89.648	0.003	0.391	0.007	180.859	3.995	5
transverse	9.25	89.57	0.003	0.397	0.007	190.649	4.066	5
transverse	10.25	89.47	0.003	0.387	0.007	197.153	4.183	5

transverse	11.25	89.382	0.004	0.412	0.009	133.178	3.41	5
transverse	0.25	89.58	0.004	0.533	0.009	145.775	3.133	5
transverse	1.25	89.538	0.004	0.519	0.01	144.486	3.2	5
transverse	2.25	89.543	0.004	0.504	0.009	143.513	3.232	5
transverse	3.25	89.566	0.004	0.442	0.008	164.348	3.642	5
transverse	4.25	89.627	0.004	0.472	0.009	152.243	3.418	5
transverse	5.25	89.726	0.004	0.484	0.009	147.209	3.323	5
transverse	6.25	89.791	0.004	0.484	0.009	154.103	3.389	5
transverse	7.25	89.793	0.004	0.487	0.009	157.294	3.42	5
transverse	8.25	89.712	0.004	0.463	0.008	170.46	3.631	5
transverse	9.25	89.545	0.004	0.446	0.008	183.242	3.806	5
transverse	10.25	89.415	0.003	0.433	0.007	179.756	3.785	5
transverse	11.25	89.347	0.005	0.451	0.01	116.21	3.074	5
transverse	0.25	89.612	0.006	0.649	0.013	107.792	2.512	5
transverse	1.25	89.552	0.005	0.575	0.011	121.911	2.819	5
transverse	2.25	89.472	0.004	0.48	0.009	150.199	3.359	5
transverse	3.25	89.497	0.004	0.493	0.009	152.068	3.314	5
transverse	4.25	89.631	0.004	0.475	0.009	156.407	3.455	5
transverse	5.25	89.739	0.004	0.483	0.008	166.894	3.494	5
transverse	6.25	89.816	0.004	0.47	0.008	178.587	3.643	5
transverse	7.25	89.839	0.004	0.491	0.008	179.577	3.608	5
transverse	8.25	89.759	0.004	0.501	0.008	180.429	3.542	5
transverse	9.25	89.555	0.004	0.484	0.008	190.702	3.708	5
transverse	10.25	89.423	0.003	0.436	0.007	198.702	3.978	5
transverse	11.25	89.366	0.004	0.416	0.009	132.59	3.398	5
transverse	0.25	89.567	0.007	0.719	0.015	91.015	2.213	5
transverse	1.25	89.554	0.007	0.693	0.016	90.396	2.308	5
transverse	2.25	89.483	0.004	0.449	0.009	152.886	3.541	5
transverse	3.25	89.463	0.004	0.434	0.008	159.764	3.619	5
transverse	4.25	89.585	0.004	0.504	0.01	143.121	3.212	5
transverse	5.25	89.7	0.004	0.449	0.008	173.475	3.702	5
transverse	6.25	89.747	0.004	0.442	0.007	182.478	3.808	5
transverse	7.25	89.754	0.003	0.441	0.007	189.899	3.896	5
transverse	8.25	89.704	0.003	0.392	0.006	213.31	4.333	5
transverse	9.25	89.585	0.003	0.394	0.006	224.582	4.454	5
transverse	10.25	89.467	0.003	0.395	0.006	228.225	4.433	5
transverse	11.25	89.382	0.004	0.404	0.008	156.233	3.713	5
transverse	0.25	89.566	0.003	0.358	0.007	180.145	4.143	5
transverse	1.25	89.552	0.003	0.369	0.007	178.622	4.088	5
transverse	2.25	89.549	0.003	0.402	0.007	178.058	3.915	5
transverse	3.25	89.573	0.003	0.384	0.007	182.861	4.083	5
transverse	4.25	89.611	0.003	0.405	0.007	181.993	3.965	5
transverse	5.25	89.642	0.003	0.392	0.007	195.909	4.192	5
transverse	6.25	89.663	0.003	0.387	0.006	209.689	4.297	5
transverse	7.25	89.662	0.003	0.393	0.007	202.183	4.225	5
transverse	8.25	89.635	0.003	0.379	0.006	228.514	4.5	5
transverse	9.25	89.573	0.003	0.37	0.006	236.871	4.654	5
transverse	10.25	89.498	0.003	0.382	0.006	226.833	4.487	5
transverse	11.25	89.425	0.003	0.39	0.007	165.051	3.857	5
transverse	0.25	89.534	0.003	0.36	0.006	189.801	4.218	5
transverse	1.25	89.53	0.003	0.354	0.006	188.948	4.298	5
transverse	2.25	89.527	0.003	0.357	0.006	194.966	4.305	5

transverse	3.25	89.534	0.003	0.356	0.006	202.131	4.404	5
transverse	4.25	89.533	0.003	0.351	0.006	214.875	4.562	5
transverse	5.25	89.531	0.003	0.367	0.006	218.721	4.518	5
transverse	6.25	89.532	0.003	0.358	0.006	217.364	4.565	5
transverse	7.25	89.529	0.003	0.354	0.006	220.621	4.618	5
transverse	8.25	89.529	0.003	0.34	0.006	235.047	4.846	5
transverse	9.25	89.528	0.003	0.356	0.006	239.831	4.761	5
transverse	10.25	89.531	0.003	0.35	0.005	244.3	4.859	5
transverse	11.25	89.536	0.003	0.392	0.007	165.016	3.816	5
transverse	-64	89.561	0.003	0.335	0.006	220.944	4.766	5
transverse	-60	89.561	0.003	0.333	0.006	220.093	4.769	5
transverse	-56	89.547	0.003	0.35	0.006	222.766	4.678	5
transverse	-52	89.531	0.003	0.346	0.006	207.162	4.535	5
transverse	-48	89.516	0.003	0.365	0.006	205.132	4.4	5
transverse	-44	89.507	0.003	0.361	0.006	206.608	4.429	5
transverse	-40	89.512	0.003	0.36	0.006	207.512	4.424	5
transverse	-36	89.513	0.003	0.347	0.006	209.008	4.577	5
transverse	-32	89.517	0.003	0.357	0.006	216.211	4.512	5
transverse	-28	89.52	0.003	0.376	0.006	197.475	4.259	5
transverse	-24	89.555	0.003	0.37	0.006	199.784	4.288	5
transverse	-20	89.582	0.003	0.354	0.006	208.815	4.472	5
transverse	-16	89.606	0.003	0.371	0.006	203.324	4.345	5
transverse	-14	89.621	0.003	0.379	0.007	190.277	4.202	5
transverse	-12	89.644	0.003	0.41	0.007	183.879	3.963	5
transverse	-10	89.662	0.004	0.417	0.008	163.694	3.738	5
transverse	-8	89.709	0.004	0.473	0.009	141.661	3.309	5
transverse	-6	89.737	0.004	0.499	0.008	165.581	3.417	5
transverse	-4	89.739	0.004	0.466	0.008	173.813	3.61	5
transverse	-2	89.734	0.004	0.511	0.009	153.376	3.285	5
transverse	0	89.716	0.004	0.487	0.009	155.213	3.394	5
transverse	2	89.674	0.004	0.425	0.008	176.589	3.854	5
transverse	4	89.654	0.003	0.394	0.007	191.666	4.15	5
transverse	6	89.624	0.003	0.375	0.006	195.235	4.231	5
transverse	8	89.603	0.003	0.356	0.006	215.476	4.561	5
transverse	10	89.578	0.003	0.358	0.006	218.169	4.557	5
transverse	12	89.548	0.003	0.355	0.006	214.019	4.521	5
transverse	14	89.529	0.003	0.343	0.006	218.345	4.704	5
transverse	16	89.531	0.003	0.355	0.006	219.417	4.605	5
transverse	20	89.531	0.003	0.365	0.006	199.798	4.354	5
transverse	24	89.527	0.003	0.35	0.006	207.924	4.544	5
transverse	28	89.524	0.003	0.357	0.006	205.39	4.47	5
transverse	32	89.533	0.003	0.374	0.007	189.236	4.205	5
transverse	36	89.529	0.003	0.366	0.006	204.066	4.381	5
transverse	40	89.529	0.003	0.361	0.006	201.745	4.427	5
transverse	44	89.531	0.003	0.346	0.006	222.23	4.668	5
transverse	48	89.542	0.003	0.361	0.006	199.003	4.386	5
transverse	52	89.558	0.003	0.352	0.006	217.718	4.624	5
transverse	56	89.573	0.003	0.357	0.006	212.054	4.501	5
transverse	60	89.575	0.003	0.353	0.006	217.612	4.584	5
transverse	64	89.599	0.002	0.374	0.005	283.453	5.018	5
longitudina	0.25	89.667	0.004	0.376	0.008	217.24	5.047	20
longitudina	1.25	89.632	0.003	0.38	0.006	318.43	5.838	20

longitudina	2.25	89.630	0.003	0.391	0.006	307.529	5.663	20
longitudina	3.25	89.624	0.003	0.368	0.006	315.106	5.897	20
longitudina	4.25	89.622	0.003	0.377	0.006	289.117	5.662	20
longitudina	5.25	89.619	0.003	0.384	0.007	280.469	5.552	20
longitudina	6.25	89.622	0.003	0.382	0.006	294.446	5.661	20
longitudina	7.25	89.617	0.003	0.384	0.006	296.404	5.678	20
longitudina	8.25	89.622	0.003	0.388	0.007	285.123	5.57	20
longitudina	9.25	89.623	0.003	0.382	0.006	318.747	5.818	20
longitudina	10.25	89.625	0.003	0.391	0.006	323.191	5.794	20
longitudina	11.25	89.616	0.003	0.376	0.006	323.539	5.888	20
longitudina	0.25	89.461	0.003	0.391	0.008	220.958	4.886	18
longitudina	1.25	89.440	0.003	0.397	0.006	279.747	5.299	18
longitudina	2.25	89.440	0.003	0.385	0.007	273.444	5.357	18
longitudina	3.25	89.449	0.003	0.382	0.007	265.781	5.338	18
longitudina	4.25	89.436	0.003	0.368	0.007	258.219	5.362	18
longitudina	5.25	89.437	0.003	0.375	0.007	248.684	5.278	18
longitudina	6.25	89.416	0.003	0.366	0.007	259.282	5.437	18
longitudina	7.25	89.402	0.003	0.384	0.007	261.706	5.309	18
longitudina	8.25	89.386	0.003	0.379	0.007	265.953	5.338	18
longitudina	9.25	89.383	0.003	0.408	0.007	258.27	5.121	18
longitudina	10.25	89.390	0.003	0.425	0.007	242.218	4.854	18
longitudina	11.25	89.390	0.004	0.433	0.008	226.022	4.705	18
longitudina	0.25	89.425	0.004	0.398	0.008	208.486	4.761	18
longitudina	1.25	89.396	0.003	0.41	0.007	253.17	5.058	18
longitudina	2.25	89.391	0.003	0.407	0.007	246.329	4.993	18
longitudina	3.25	89.373	0.003	0.422	0.008	236.29	4.862	18
longitudina	4.25	89.357	0.004	0.424	0.008	228.486	4.8	18
longitudina	5.25	89.328	0.004	0.44	0.008	232.162	4.736	18
longitudina	6.25	89.300	0.003	0.424	0.008	235.443	4.856	18
longitudina	7.25	89.283	0.003	0.425	0.008	231.987	4.792	18
longitudina	8.25	89.286	0.004	0.45	0.009	214.994	4.529	18
longitudina	9.25	89.268	0.004	0.5	0.01	200.488	4.208	18
longitudina	10.25	89.257	0.005	0.56	0.01	192.771	3.873	18
longitudina	11.25	89.266	0.005	0.562	0.01	185.281	3.814	18
longitudina	0.25	89.399	0.004	0.402	0.009	172.554	4.408	18
longitudina	1.25	89.375	0.003	0.403	0.007	244.017	5.013	18
longitudina	2.25	89.355	0.004	0.436	0.008	218.399	4.636	18
longitudina	3.25	89.345	0.004	0.467	0.009	199.425	4.319	18
longitudina	4.25	89.353	0.004	0.486	0.009	198.544	4.218	18
longitudina	5.25	89.327	0.004	0.438	0.008	217.192	4.634	18
longitudina	6.25	89.296	0.004	0.43	0.008	221.336	4.708	18
longitudina	7.25	89.250	0.003	0.416	0.008	235.464	4.878	18
longitudina	8.25	89.221	0.004	0.422	0.008	218.632	4.683	18
longitudina	9.25	89.230	0.004	0.498	0.01	183.965	4.058	18
longitudina	10.25	89.277	0.005	0.59	0.012	171.729	3.628	18
longitudina	11.25	89.325	0.005	0.614	0.012	174.141	3.574	18
longitudina	0.25	89.685	0.004	0.359	0.009	163.909	4.587	18
longitudina	1.25	89.631	0.003	0.354	0.006	298.256	5.813	18
longitudina	2.25	89.611	0.003	0.333	0.005	317.127	6.13	18
longitudina	3.25	89.606	0.003	0.352	0.006	288.57	5.775	18
longitudina	4.25	89.606	0.003	0.349	0.006	290.655	5.834	18
longitudina	5.25	89.607	0.003	0.367	0.006	281.353	5.618	18

longitudina	6.25	89.606	0.003	0.36	0.006	282.175	5.673	18
longitudina	7.25	89.608	0.003	0.353	0.006	300.834	5.875	18
longitudina	8.25	89.602	0.003	0.354	0.006	293.233	5.795	18
longitudina	9.25	89.610	0.003	0.359	0.006	296.936	5.843	18
longitudina	10.25	89.600	0.003	0.352	0.006	325.03	6.053	18
longitudina	11.25	89.607	0.003	0.362	0.006	313.617	5.845	18
longitudina	0.25	89.475	0.005	0.382	0.013	115.455	3.953	18
longitudina	1.25	89.445	0.003	0.399	0.007	248.266	5.101	18
longitudina	2.25	89.439	0.003	0.387	0.006	273.831	5.324	18
longitudina	3.25	89.438	0.003	0.38	0.007	260.849	5.309	18
longitudina	4.25	89.446	0.003	0.38	0.007	268.191	5.366	18
longitudina	5.25	89.440	0.003	0.38	0.007	264.379	5.369	18
longitudina	6.25	89.427	0.003	0.381	0.007	262.904	5.314	18
longitudina	7.25	89.416	0.003	0.376	0.007	263.177	5.379	18
longitudina	8.25	89.404	0.003	0.385	0.007	268.222	5.331	18
longitudina	9.25	89.387	0.003	0.404	0.007	264.807	5.17	18
longitudina	10.25	89.383	0.003	0.392	0.006	283.547	5.372	18
longitudina	11.25	89.377	0.003	0.391	0.007	281.901	5.385	18
longitudina	0.25	89.430	0.005	0.389	0.012	116.957	3.878	18
longitudina	1.25	89.403	0.003	0.416	0.007	235.29	4.816	18
longitudina	2.25	89.406	0.003	0.406	0.007	247.408	5.025	18
longitudina	3.25	89.421	0.003	0.396	0.007	254.213	5.145	18
longitudina	4.25	89.421	0.003	0.404	0.007	242.452	4.989	18
longitudina	5.25	89.405	0.003	0.408	0.008	230.507	4.909	18
longitudina	6.25	89.378	0.004	0.429	0.008	218.085	4.687	18
longitudina	7.25	89.351	0.004	0.441	0.008	217.962	4.598	18
longitudina	8.25	89.329	0.004	0.43	0.008	217.855	4.674	18
longitudina	9.25	89.337	0.004	0.446	0.008	220.378	4.606	18
longitudina	10.25	89.364	0.004	0.467	0.009	208.031	4.433	18
longitudina	11.25	89.388	0.005	0.596	0.012	169.777	3.652	18
longitudina	-64	89.536	0.003	0.392	0.007	244.773	5.111	18
longitudina	-60	89.513	0.003	0.385	0.007	264.253	5.324	18
longitudina	-56	89.501	0.003	0.376	0.007	265.491	5.398	18
longitudina	-52	89.523	0.003	0.389	0.007	256.47	5.229	18
longitudina	-48	89.564	0.003	0.386	0.007	258.861	5.302	18
longitudina	-44	89.617	0.003	0.375	0.006	269.641	5.426	18
longitudina	-40	89.657	0.003	0.373	0.007	269.347	5.483	18
longitudina	-36	89.663	0.003	0.358	0.006	282.773	5.705	18
longitudina	-32	89.672	0.003	0.367	0.007	270.495	5.564	18
longitudina	-28	89.669	0.003	0.354	0.006	263.664	5.592	18
longitudina	-24	89.647	0.003	0.376	0.007	261.457	5.396	18
longitudina	-20	89.614	0.003	0.36	0.006	267.695	5.561	18
longitudina	-16	89.553	0.003	0.369	0.007	263.027	5.433	18
longitudina	-14	89.472	0.003	0.368	0.007	256.225	5.37	18
longitudina	-12	89.450	0.003	0.363	0.007	265.048	5.501	18
longitudina	-10	89.413	0.003	0.371	0.007	258.264	5.355	18
longitudina	-8	89.345	0.003	0.408	0.007	241.768	4.975	18
longitudina	-6	89.294	0.003	0.419	0.008	244.991	4.967	18
longitudina	-4	89.289	0.003	0.428	0.008	237.423	4.839	18
longitudina	-2	89.292	0.004	0.428	0.008	226.636	4.741	18
longitudina	0	89.300	0.004	0.447	0.008	215.506	4.574	18
longitudina	2	89.357	0.004	0.462	0.009	211.035	4.457	18

longitudina	4	89.387	0.004	0.416	0.008	227.414	4.833	18
longitudina	6	89.423	0.003	0.395	0.007	252.281	5.139	18
longitudina	8	89.445	0.003	0.38	0.007	265.938	5.395	18
longitudina	10	89.479	0.003	0.377	0.007	267.889	5.423	18
longitudina	12	89.525	0.003	0.399	0.007	257.42	5.195	18
longitudina	14	89.562	0.003	0.386	0.007	256.448	5.285	18
longitudina	16	89.589	0.003	0.378	0.007	258.986	5.377	18
longitudina	20	89.626	0.003	0.375	0.007	273.636	5.502	18
longitudina	24	89.619	0.003	0.37	0.006	280.664	5.603	18
longitudina	28	89.612	0.003	0.353	0.006	287.317	5.756	18
longitudina	32	89.613	0.003	0.348	0.006	290.49	5.844	18
longitudina	36	89.612	0.003	0.359	0.006	284.915	5.692	18
longitudina	40	89.606	0.003	0.351	0.006	279.382	5.743	18
longitudina	44	89.608	0.003	0.357	0.006	283.804	5.738	18
longitudina	48	89.603	0.003	0.347	0.006	294.07	5.873	18
longitudina	52	89.598	0.003	0.366	0.006	285.543	5.639	18
longitudina	56	89.587	0.003	0.358	0.006	282.413	5.694	18
longitudina	60	89.530	0.003	0.34	0.006	297.111	5.938	18
longitudina	64	89.488	0.003	0.358	0.006	276.805	5.62	18

Detector #3
Ferritic Steel D-zero Comb-like Sample

direction	Position (mm)	2Θ / d / a [° / A]	uncertainty	FWHM [°]	uncertainty [°]	Peak Height	uncertainty	sampling time (min.)
normal	0.25	89.559	0.003	0.35	0.008	283.07	6.317	50
normal	1.25	89.56	0.003	0.347	0.007	254.73	5.682	30
normal	2.25	89.573	0.004	0.342	0.009	156.2	4.348	15
normal	3.25	89.569	0.004	0.347	0.008	155.07	4.19	12
normal	4.25	89.562	0.003	0.341	0.007	166.53	4.228	10
normal	5.25	89.566	0.004	0.359	0.008	156.86	3.982	8
normal	6.25	89.561	0.003	0.346	0.006	213.56	4.627	9
normal	7.25	89.562	0.003	0.362	0.005	274.08	5.101	10
normal	8.25	89.562	0.002	0.349	0.004	384.66	6.111	12
normal	9.25	89.553	0.002	0.358	0.004	564.18	7.258	15
normal	10.25	89.553	0.001	0.355	0.002	1495.3	11.733	30
normal	11.25	89.559	0.001	0.361	0.001	3078.7	16.575	50
normal	0.25	89.564	0.006	0.657	0.013	213.83	4.294	50
normal	1.25	89.563	0.004	0.475	0.01	209.05	4.567	30
normal	2.25	89.559	0.005	0.439	0.01	143.85	3.72	15
normal	3.25	89.558	0.004	0.397	0.009	159.27	3.968	12
normal	4.25	89.565	0.004	0.4	0.008	160.09	3.875	10
normal	5.25	89.573	0.004	0.411	0.008	160.47	3.736	8
normal	6.25	89.563	0.003	0.4	0.007	205.73	4.259	9
normal	7.25	89.573	0.003	0.407	0.006	254.65	4.673	10
normal	8.25	89.581	0.002	0.392	0.005	361.16	5.643	12
normal	9.25	89.571	0.002	0.395	0.004	569.55	6.987	15
normal	10.25	89.572	0.001	0.389	0.002	1491.3	11.239	30
normal	11.25	89.573	0.001	0.401	0.002	2728.7	14.945	50
normal	0.25	89.554	0.004	0.517	0.009	283.99	5.221	50
normal	1.25	89.549	0.004	0.51	0.01	218.99	4.459	30
normal	2.25	89.557	0.005	0.522	0.011	143.36	3.388	15
normal	3.25	89.571	0.005	0.483	0.01	144.77	3.458	12
normal	4.25	89.568	0.004	0.403	0.008	166.44	3.934	10
normal	5.25	89.569	0.004	0.45	0.009	152.43	3.52	8
normal	6.25	89.566	0.004	0.49	0.008	181.77	3.663	9
normal	7.25	89.572	0.004	0.495	0.008	209.57	3.926	10
normal	8.25	89.577	0.003	0.456	0.006	322.19	5.009	12
normal	9.25	89.566	0.002	0.429	0.004	525.63	6.469	15
normal	10.25	89.575	0.001	0.42	0.002	1364.7	10.427	30
normal	11.25	89.569	0.001	0.429	0.002	2405.7	13.713	50
normal	0.25	89.553	0.004	0.669	0.01	321.44	4.775	50
normal	1.25	89.553	0.004	0.593	0.01	241.5	4.274	30
normal	2.25	89.562	0.004	0.497	0.009	176.75	3.786	15
normal	3.25	89.554	0.004	0.452	0.009	174.9	3.883	12
normal	4.25	89.568	0.004	0.452	0.009	160.56	3.637	10
normal	5.25	89.56	0.004	0.464	0.009	157.73	3.564	9
normal	6.25	89.571	0.004	0.46	0.009	160.55	3.606	8
normal	7.25	89.577	0.004	0.461	0.009	138.65	3.291	6
normal	8.25	89.568	0.005	0.473	0.01	109.14	2.847	4
normal	9.25	89.565	0.004	0.468	0.009	120.03	2.943	3.5

normal	10.25	89.572	0.004	0.419	0.008	140.392	3.324	3
normal	11.25	89.563	0.004	0.436	0.008	127.496	3.085	3
normal	0.25	89.547	0.005	0.733	0.012	257.175	4.258	50
normal	1.25	89.555	0.005	0.631	0.012	200.279	3.908	30
normal	2.25	89.564	0.004	0.469	0.01	161.497	3.791	15
normal	3.25	89.563	0.004	0.419	0.008	175.349	4.01	12
normal	4.25	89.569	0.004	0.434	0.009	156.068	3.708	10
normal	5.25	89.57	0.004	0.431	0.008	168.576	3.802	9
normal	6.25	89.569	0.004	0.435	0.008	185.628	3.908	8
normal	7.25	89.57	0.004	0.436	0.008	152.817	3.505	6
normal	8.25	89.569	0.004	0.416	0.008	123.485	3.188	4
normal	9.25	89.569	0.004	0.412	0.007	148.786	3.458	3.5
normal	10.25	89.572	0.003	0.406	0.007	154.075	3.518	3
normal	11.25	89.57	0.004	0.421	0.008	129.205	3.217	3
normal	0.25	89.563	0.002	0.375	0.005	491.448	7.4	50
normal	1.25	89.553	0.003	0.387	0.006	350.969	6.063	30
normal	2.25	89.56	0.003	0.392	0.007	209.451	4.533	15
normal	3.25	89.562	0.003	0.388	0.007	199.783	4.382	12
normal	4.25	89.571	0.003	0.381	0.007	200.707	4.371	10
normal	5.25	89.569	0.003	0.365	0.006	216.134	4.564	9
normal	6.25	89.566	0.003	0.372	0.006	206.286	4.4	8
normal	7.25	89.565	0.003	0.376	0.007	181.918	4.09	6
normal	8.25	89.572	0.004	0.387	0.008	129.505	3.369	4
normal	9.25	89.56	0.004	0.385	0.007	143.986	3.543	3.5
normal	10.25	89.562	0.003	0.383	0.006	161.05	3.691	3
normal	11.25	89.561	0.003	0.41	0.007	155.78	3.504	3
normal	0.25	89.55	0.004	0.365	0.008	258.082	6.014	50
normal	1.25	89.549	0.004	0.37	0.008	217.095	5.177	30
normal	2.25	89.556	0.004	0.38	0.01	141.331	3.952	15
normal	3.25	89.562	0.004	0.363	0.008	156.509	4.098	12
normal	4.25	89.561	0.003	0.363	0.007	167.9	4.112	10
normal	5.25	89.564	0.003	0.357	0.007	185.68	4.27	9
normal	6.25	89.564	0.003	0.363	0.006	207.714	4.461	8
normal	7.25	89.563	0.003	0.368	0.006	186.875	4.111	6
normal	8.25	89.56	0.003	0.341	0.007	144.595	3.745	4
normal	9.25	89.558	0.003	0.344	0.007	148.208	3.746	3.5
normal	10.25	89.553	0.003	0.343	0.006	159.367	3.879	3
normal	11.25	89.563	0.003	0.358	0.006	193.997	4.164	3

Detector #4
Ferritic Steel Weld Plate

direction	Position (mm)	2Θ / d / a [° / A]	uncertainty	FWHM [°]	uncertainty [°]	Peak Height	uncertainty	sampling time
normal	0.25	89.577	0.007	0.396	0.016	86.317	3.485	18
normal	1.25	89.596	0.005	0.413	0.012	123.56	3.683	15
normal	2.25	89.598	0.005	0.402	0.01	124.72	3.568	10
normal	3.25	89.605	0.004	0.4	0.009	149.98	3.82	9
normal	4.25	89.608	0.004	0.402	0.009	138.27	3.557	6
normal	5.25	89.61	0.004	0.389	0.01	97.609	2.99	3
normal	6.25	89.616	0.003	0.401	0.007	182.5	3.916	4
normal	7.25	89.615	0.002	0.408	0.005	376.44	5.491	6
normal	8.25	89.616	0.002	0.404	0.003	767.02	7.838	9
normal	9.25	89.624	0.001	0.396	0.002	1148	9.572	10
normal	10.25	89.626	0.001	0.404	0.002	2281.6	13.314	15
normal	11.25	89.633	0.001	0.401	0.001	3632.9	16.76	18
normal	0.25	89.674	0.007	0.451	0.017	85.197	3.245	18
normal	1.25	89.677	0.005	0.437	0.011	132.63	3.664	15
normal	2.25	89.678	0.004	0.391	0.01	128.89	3.646	10
normal	3.25	89.674	0.004	0.418	0.009	157.25	3.78	9
normal	4.25	89.663	0.004	0.4	0.008	151.07	3.684	6
normal	5.25	89.652	0.005	0.417	0.01	100.72	2.894	3
normal	6.25	89.638	0.003	0.429	0.007	186.62	3.824	4
normal	7.25	89.634	0.002	0.425	0.005	360.75	5.318	6
normal	8.25	89.645	0.002	0.421	0.003	758.36	7.659	9
normal	9.25	89.665	0.001	0.419	0.003	1123.5	9.262	10
normal	10.25	89.693	0.001	0.415	0.002	2227.3	13.008	15
normal	11.25	89.727	0.001	0.416	0.001	3516.9	16.225	18
normal	0.25	89.732	0.01	0.587	0.025	68.661	2.716	18
normal	1.25	89.746	0.007	0.607	0.017	98.043	2.843	15
normal	2.25	89.751	0.008	0.668	0.019	81.081	2.374	10
normal	3.25	89.737	0.005	0.503	0.012	125.32	3.23	9
normal	4.25	89.736	0.005	0.472	0.01	130.96	3.205	6
normal	5.25	89.714	0.005	0.481	0.012	86.941	2.546	3
normal	6.25	89.668	0.004	0.495	0.009	159.1	3.364	4
normal	7.25	89.653	0.003	0.472	0.006	332.87	4.9	6
normal	8.25	89.654	0.002	0.459	0.004	688.64	7.045	9
normal	9.25	89.674	0.001	0.446	0.003	1066.3	8.773	10
normal	10.25	89.723	0.001	0.441	0.002	2090.3	12.258	15
normal	11.25	89.763	0.001	0.441	0.001	3252	15.22	18
normal	0.25	89.651	0.008	0.65	0.02	93.507	2.811	18
normal	1.25	89.674	0.008	0.66	0.018	99.521	2.742	15
normal	2.25	89.726	0.006	0.506	0.014	107.65	3.078	10
normal	3.25	89.745	0.004	0.471	0.01	156.32	3.604	9
normal	4.25	89.734	0.004	0.476	0.009	143.09	3.337	6
normal	5.25	89.692	0.005	0.5	0.011	93.071	2.565	3
normal	6.25	89.665	0.004	0.494	0.009	162.24	3.388	4
normal	7.25	89.635	0.003	0.529	0.006	311.31	4.467	6
normal	8.25	89.643	0.002	0.547	0.004	579.63	5.987	9
normal	9.25	89.69	0.002	0.506	0.003	926.57	7.768	10
normal	10.25	89.746	0.001	0.471	0.002	1939.7	11.474	15

normal	11.25	89.783	0.001	0.466	0.002	3033.364	14.311	18
normal	0.25	89.653	0.009	0.691	0.022	83.505	2.625	18
normal	1.25	89.644	0.007	0.627	0.017	101.576	2.864	15
normal	2.25	89.692	0.008	0.616	0.018	89.49	2.608	10
normal	3.25	89.744	0.005	0.539	0.011	138.157	3.212	9
normal	4.25	89.734	0.004	0.485	0.01	141.621	3.292	6
normal	5.25	89.684	0.005	0.508	0.011	97.054	2.605	3
normal	6.25	89.626	0.004	0.516	0.008	170.581	3.387	4
normal	7.25	89.604	0.003	0.529	0.006	321.887	4.559	6
normal	8.25	89.612	0.002	0.509	0.004	635.192	6.468	9
normal	9.25	89.664	0.001	0.489	0.003	978.381	8.088	10
normal	10.25	89.727	0.001	0.463	0.002	2043.581	11.873	15
normal	11.25	89.77	0.001	0.459	0.002	3209.792	14.831	18
normal	0.25	89.615	0.007	0.428	0.015	97.341	3.501	18
normal	1.25	89.647	0.005	0.448	0.012	127.343	3.614	15
normal	2.25	89.683	0.005	0.438	0.01	133.887	3.511	10
normal	3.25	89.712	0.004	0.437	0.009	160.423	3.749	9
normal	4.25	89.704	0.004	0.433	0.009	146.972	3.542	6
normal	5.25	89.699	0.005	0.446	0.01	101.917	2.814	3
normal	6.25	89.66	0.003	0.438	0.007	191.07	3.85	4
normal	7.25	89.639	0.002	0.429	0.005	385.462	5.456	6
normal	8.25	89.645	0.002	0.422	0.003	786.729	7.816	9
normal	9.25	89.663	0.001	0.429	0.003	1129.824	9.197	10
normal	10.25	89.701	0.001	0.427	0.002	2204.774	12.765	15
normal	11.25	89.743	0.001	0.435	0.001	3373.743	15.587	18
normal	0.25	89.592	0.022	0.238	0.052	5.468	1.008	1
normal	1.25	89.637	0.015	0.404	0.034	10.279	0.984	1
normal	2.25	89.621	0.01	0.378	0.023	22.851	1.492	1.5
normal	3.25	89.619	0.008	0.369	0.018	30.152	1.707	1.5
normal	4.25	89.618	0.006	0.379	0.012	56.315	2.248	2
normal	5.25	89.616	0.005	0.417	0.01	99.332	2.835	3
normal	6.25	89.614	0.003	0.395	0.007	190.864	4.032	4
normal	7.25	89.619	0.002	0.402	0.005	384.52	5.611	6
normal	8.25	89.622	0.001	0.4	0.003	801.075	8.021	9
normal	9.25	89.623	0.001	0.395	0.002	1207.104	9.858	10
normal	10.25	89.627	0.001	0.393	0.002	2388.922	13.799	15
normal	11.25	89.629	0.001	0.4	0.001	3755.341	17.073	18
normal	-64	89.606	0.003	0.4	0.006	203.025	4.127	4
normal	-60	89.614	0.003	0.39	0.006	204.638	4.189	4
normal	-56	89.596	0.003	0.406	0.006	205.456	4.105	4
normal	-52	89.58	0.003	0.392	0.006	203.314	4.184	4
normal	-48	89.573	0.003	0.409	0.007	196.018	4.016	4
normal	-44	89.564	0.003	0.404	0.006	204.323	4.127	4
normal	-40	89.563	0.003	0.392	0.006	209.179	4.243	4
normal	-36	89.573	0.003	0.397	0.006	210.992	4.209	4
normal	-32	89.571	0.003	0.4	0.006	212.3	4.216	4
normal	-28	89.579	0.003	0.391	0.006	217.886	4.307	4
normal	-24	89.578	0.003	0.414	0.007	199.387	4.035	4
normal	-20	89.581	0.003	0.393	0.006	213.472	4.247	4
normal	-16	89.594	0.003	0.417	0.006	206.56	4.046	4
normal	-14	89.606	0.003	0.409	0.006	203.57	4.092	4
normal	-12	89.609	0.003	0.427	0.006	203.602	3.971	4

normal	-10	89.615	0.003	0.431	0.007	198.623	3.952	4
normal	-8	89.634	0.004	0.487	0.008	171.277	3.487	4
normal	-6	89.633	0.004	0.509	0.008	173.385	3.431	4
normal	-4	89.62	0.004	0.497	0.008	179.513	3.521	4
normal	-2	89.589	0.004	0.51	0.008	183.388	3.519	4
normal	0	89.594	0.004	0.49	0.008	185.234	3.611	4
normal	2	89.613	0.003	0.434	0.007	208.685	4.015	4
normal	4	89.626	0.003	0.423	0.006	212.021	4.091	4
normal	6	89.629	0.003	0.402	0.006	216.453	4.247	4
normal	8	89.606	0.003	0.42	0.006	210.325	4.062	4
normal	10	89.584	0.003	0.402	0.006	226.902	4.298	4
normal	12	89.585	0.003	0.391	0.006	216.636	4.316	4
normal	14	89.579	0.003	0.383	0.006	220.384	4.399	4
normal	16	89.58	0.003	0.396	0.006	221.878	4.288	4
normal	20	89.587	0.003	0.39	0.006	217.977	4.316	4
normal	24	89.58	0.003	0.388	0.006	219.426	4.353	4
normal	28	89.586	0.003	0.396	0.006	221.4	4.318	4
normal	32	89.591	0.003	0.377	0.006	224.713	4.448	4
normal	36	89.581	0.003	0.397	0.006	214.561	4.249	4
normal	40	89.588	0.003	0.387	0.006	213.511	4.266	4
normal	44	89.587	0.003	0.396	0.006	216.052	4.245	4
normal	48	89.586	0.003	0.395	0.006	213.569	4.256	4
normal	52	89.602	0.003	0.383	0.006	207.355	4.265	4
normal	56	89.616	0.003	0.393	0.006	209.772	4.233	4
normal	60	89.63	0.003	0.395	0.006	208.656	4.183	4
normal	64	89.606	0.002	0.407	0.005	339.737	5.189	4
transverse	0.25	89.595	0.003	0.409	0.007	169.885	3.775	5
transverse	1.25	89.59	0.003	0.401	0.007	174.765	3.888	5
transverse	2.25	89.59	0.003	0.387	0.007	189.112	4.083	5
transverse	3.25	89.594	0.003	0.405	0.007	184.761	3.981	5
transverse	4.25	89.59	0.003	0.397	0.007	190.514	4.067	5
transverse	5.25	89.59	0.003	0.395	0.007	200.204	4.194	5
transverse	6.25	89.595	0.003	0.4	0.007	205.294	4.208	5
transverse	7.25	89.59	0.003	0.393	0.006	221.265	4.381	5
transverse	8.25	89.588	0.003	0.386	0.006	220.283	4.404	5
transverse	9.25	89.587	0.003	0.399	0.006	229.719	4.429	5
transverse	10.25	89.59	0.003	0.402	0.006	240.331	4.437	5
transverse	11.25	89.594	0.004	0.435	0.009	129.899	3.255	5
transverse	0.25	89.594	0.004	0.496	0.009	146.924	3.271	5
transverse	1.25	89.624	0.004	0.443	0.008	174.466	3.704	5
transverse	2.25	89.638	0.003	0.443	0.007	182.924	3.757	5
transverse	3.25	89.665	0.003	0.448	0.007	181.437	3.731	5
transverse	4.25	89.697	0.004	0.459	0.008	171.803	3.616	5
transverse	5.25	89.723	0.004	0.452	0.008	170.715	3.654	5
transverse	6.25	89.747	0.004	0.453	0.008	169.937	3.642	5
transverse	7.25	89.751	0.004	0.429	0.007	176.269	3.77	5
transverse	8.25	89.729	0.003	0.43	0.007	178.254	3.762	5
transverse	9.25	89.649	0.003	0.441	0.007	186.846	3.8	5
transverse	10.25	89.537	0.003	0.438	0.007	194.823	3.929	5
transverse	11.25	89.447	0.005	0.476	0.01	121.146	3.028	5
transverse	0.25	89.659	0.004	0.553	0.01	144.996	3.067	5
transverse	1.25	89.62	0.005	0.565	0.01	142.42	3.019	5

transverse	2.25	89.619	0.004	0.511	0.009	147.902	3.245	5
transverse	3.25	89.647	0.004	0.491	0.009	155.836	3.368	5
transverse	4.25	89.715	0.004	0.519	0.009	148.563	3.192	5
transverse	5.25	89.796	0.004	0.532	0.01	148.664	3.178	5
transverse	6.25	89.858	0.004	0.544	0.01	148.093	3.146	5
transverse	7.25	89.878	0.004	0.519	0.009	155.295	3.283	5
transverse	8.25	89.793	0.004	0.514	0.009	164.093	3.378	5
transverse	9.25	89.62	0.004	0.497	0.008	178.323	3.536	5
transverse	10.25	89.485	0.004	0.467	0.008	176.541	3.607	5
transverse	11.25	89.414	0.005	0.47	0.01	116.089	2.978	5
transverse	0.25	89.697	0.006	0.689	0.014	103.429	2.374	5
transverse	1.25	89.636	0.005	0.594	0.011	125.176	2.783	5
transverse	2.25	89.548	0.004	0.525	0.009	151.19	3.2	5
transverse	3.25	89.579	0.004	0.522	0.009	155.829	3.248	5
transverse	4.25	89.705	0.004	0.545	0.009	160.193	3.227	5
transverse	5.25	89.818	0.004	0.53	0.009	167.803	3.333	5
transverse	6.25	89.896	0.004	0.521	0.008	176.568	3.423	5
transverse	7.25	89.917	0.004	0.523	0.008	181.503	3.472	5
transverse	8.25	89.837	0.004	0.552	0.008	180.071	3.36	5
transverse	9.25	89.632	0.004	0.536	0.008	184.468	3.46	5
transverse	10.25	89.496	0.003	0.489	0.007	197.87	3.711	5
transverse	11.25	89.443	0.005	0.494	0.01	120.239	2.982	5
transverse	0.25	89.651	0.007	0.765	0.016	90.898	2.139	5
transverse	1.25	89.644	0.007	0.714	0.015	96.624	2.316	5
transverse	2.25	89.56	0.004	0.486	0.01	142.143	3.313	5
transverse	3.25	89.539	0.004	0.479	0.008	161.167	3.439	5
transverse	4.25	89.672	0.004	0.529	0.01	146.532	3.147	5
transverse	5.25	89.786	0.004	0.499	0.009	164.141	3.429	5
transverse	6.25	89.827	0.004	0.489	0.008	174.341	3.544	5
transverse	7.25	89.838	0.003	0.474	0.007	193.594	3.767	5
transverse	8.25	89.79	0.003	0.467	0.007	198.872	3.852	5
transverse	9.25	89.664	0.003	0.47	0.007	206.572	3.892	5
transverse	10.25	89.55	0.003	0.435	0.007	220.062	4.138	5
transverse	11.25	89.464	0.004	0.461	0.008	158.026	3.444	5
transverse	0.25	89.638	0.003	0.392	0.007	180.357	3.95	5
transverse	1.25	89.619	0.003	0.403	0.007	178.833	3.891	5
transverse	2.25	89.626	0.004	0.429	0.008	172.629	3.736	5
transverse	3.25	89.648	0.004	0.445	0.008	169.376	3.654	5
transverse	4.25	89.687	0.004	0.448	0.008	173.897	3.675	5
transverse	5.25	89.713	0.003	0.444	0.007	184.358	3.814	5
transverse	6.25	89.736	0.003	0.425	0.007	199.01	4.015	5
transverse	7.25	89.737	0.003	0.428	0.007	204.191	4.029	5
transverse	8.25	89.72	0.003	0.412	0.006	216.713	4.237	5
transverse	9.25	89.654	0.003	0.413	0.006	229.06	4.331	5
transverse	10.25	89.583	0.003	0.397	0.006	239.425	4.487	5
transverse	11.25	89.507	0.004	0.418	0.008	165.248	3.709	5
transverse	0.25	89.611	0.003	0.385	0.007	184.782	4.036	5
transverse	1.25	89.607	0.003	0.387	0.007	190.999	4.071	5
transverse	2.25	89.605	0.003	0.404	0.007	184.595	3.939	5
transverse	3.25	89.606	0.003	0.389	0.007	196.089	4.172	5
transverse	4.25	89.606	0.003	0.398	0.007	200.722	4.142	5
transverse	5.25	89.611	0.003	0.39	0.006	212.411	4.321	5

transverse	6.25	89.606	0.003	0.39	0.006	208.971	4.296	5
transverse	7.25	89.602	0.003	0.395	0.006	214.36	4.29	5
transverse	8.25	89.606	0.003	0.396	0.006	232.221	4.438	5
transverse	9.25	89.601	0.003	0.401	0.006	230.269	4.392	5
transverse	10.25	89.601	0.003	0.392	0.006	236.577	4.474	5
transverse	11.25	89.618	0.004	0.445	0.008	154.11	3.496	5
transverse	-64	89.641	0.003	0.383	0.006	204.165	4.282	5
transverse	-60	89.637	0.003	0.401	0.007	199.658	4.146	5
transverse	-56	89.623	0.003	0.402	0.007	205.495	4.185	5
transverse	-52	89.607	0.003	0.389	0.006	205.132	4.244	5
transverse	-48	89.602	0.003	0.414	0.007	196.006	3.992	5
transverse	-44	89.587	0.003	0.409	0.007	198.514	4.085	5
transverse	-40	89.59	0.003	0.384	0.007	203.195	4.263	5
transverse	-36	89.588	0.003	0.388	0.006	204.589	4.269	5
transverse	-32	89.595	0.003	0.395	0.007	197.556	4.168	5
transverse	-28	89.599	0.003	0.402	0.007	201.173	4.15	5
transverse	-24	89.629	0.003	0.383	0.006	203.454	4.262	5
transverse	-20	89.657	0.003	0.405	0.007	194.913	4.072	5
transverse	-16	89.681	0.003	0.424	0.007	183.924	3.886	5
transverse	-14	89.703	0.003	0.411	0.007	189.159	4.028	5
transverse	-12	89.716	0.003	0.43	0.007	180.471	3.835	5
transverse	-10	89.75	0.004	0.472	0.009	158.915	3.465	5
transverse	-8	89.788	0.005	0.535	0.01	138.877	3.065	5
transverse	-6	89.809	0.004	0.537	0.009	157.505	3.21	5
transverse	-4	89.827	0.004	0.506	0.009	164.96	3.395	5
transverse	-2	89.821	0.004	0.53	0.009	164.885	3.299	5
transverse	0	89.805	0.004	0.515	0.009	158.569	3.316	5
transverse	2	89.762	0.004	0.491	0.008	172.032	3.503	5
transverse	4	89.725	0.003	0.446	0.007	187.495	3.823	5
transverse	6	89.699	0.003	0.425	0.007	197.523	4.001	5
transverse	8	89.685	0.003	0.393	0.007	205.682	4.249	5
transverse	10	89.654	0.003	0.403	0.007	206.985	4.185	5
transverse	12	89.629	0.003	0.386	0.007	207.971	4.307	5
transverse	14	89.606	0.003	0.377	0.007	204.473	4.358	5
transverse	16	89.602	0.003	0.4	0.007	202.03	4.163	5
transverse	20	89.601	0.003	0.388	0.006	201.049	4.19	5
transverse	24	89.594	0.003	0.403	0.007	201.544	4.136	5
transverse	28	89.61	0.003	0.391	0.007	206.239	4.248	5
transverse	32	89.604	0.003	0.384	0.006	201.149	4.225	5
transverse	36	89.606	0.003	0.402	0.007	199.558	4.149	5
transverse	40	89.605	0.003	0.405	0.007	199.69	4.124	5
transverse	44	89.605	0.003	0.404	0.007	203.164	4.139	5
transverse	48	89.617	0.003	0.407	0.007	204.913	4.168	5
transverse	52	89.635	0.003	0.389	0.006	210.35	4.296	5
transverse	56	89.65	0.003	0.386	0.006	211.092	4.331	5
transverse	60	89.657	0.003	0.382	0.007	201.785	4.273	5
transverse	64	89.676	0.003	0.402	0.005	279.437	4.821	5
longitudina	0.25	89.768	0.003	0.369	0.007	240.695	5.25	20
longitudina	1.25	89.728	0.002	0.354	0.005	370.75	6.344	20
longitudina	2.25	89.719	0.002	0.365	0.005	356.191	6.199	20
longitudina	3.25	89.713	0.003	0.357	0.005	343.931	6.165	20
longitudina	4.25	89.713	0.003	0.36	0.006	338.761	6.076	20

longitudina	5.25	89.709	0.003	0.355	0.006	335.451	6.125	20
longitudina	6.25	89.711	0.003	0.358	0.006	339.623	6.137	20
longitudina	7.25	89.704	0.003	0.369	0.006	324.091	5.928	20
longitudina	8.25	89.710	0.003	0.36	0.006	347.166	6.199	20
longitudina	9.25	89.706	0.002	0.354	0.005	361.593	6.335	20
longitudina	10.25	89.707	0.002	0.364	0.005	370.253	6.251	20
longitudina	11.25	89.704	0.002	0.371	0.005	361.359	6.168	20
longitudina	0.25	89.534	0.003	0.391	0.007	226.63	4.865	18
longitudina	1.25	89.519	0.003	0.383	0.006	293.05	5.417	18
longitudina	2.25	89.523	0.003	0.377	0.006	286.709	5.456	18
longitudina	3.25	89.525	0.003	0.376	0.007	274.422	5.379	18
longitudina	4.25	89.525	0.003	0.37	0.006	280.421	5.502	18
longitudina	5.25	89.517	0.003	0.387	0.007	271.851	5.293	18
longitudina	6.25	89.502	0.003	0.404	0.007	259.106	5.073	18
longitudina	7.25	89.484	0.003	0.401	0.007	269.8	5.186	18
longitudina	8.25	89.475	0.003	0.391	0.007	272.325	5.254	18
longitudina	9.25	89.480	0.003	0.409	0.007	264.191	5.093	18
longitudina	10.25	89.483	0.003	0.415	0.007	264.732	5.061	18
longitudina	11.25	89.492	0.003	0.432	0.008	247.237	4.854	18
longitudina	0.25	89.511	0.003	0.403	0.008	223.564	4.776	18
longitudina	1.25	89.490	0.003	0.399	0.006	293.169	5.336	18
longitudina	2.25	89.481	0.003	0.417	0.007	253.285	4.951	18
longitudina	3.25	89.465	0.004	0.446	0.008	234.352	4.678	18
longitudina	4.25	89.435	0.004	0.47	0.009	219.873	4.457	18
longitudina	5.25	89.408	0.004	0.459	0.008	234.377	4.592	18
longitudina	6.25	89.377	0.003	0.424	0.008	246.964	4.891	18
longitudina	7.25	89.362	0.004	0.453	0.008	236.027	4.593	18
longitudina	8.25	89.360	0.004	0.464	0.009	224.843	4.496	18
longitudina	9.25	89.352	0.004	0.529	0.01	206.529	4.075	18
longitudina	10.25	89.341	0.004	0.565	0.01	202.433	3.923	18
longitudina	11.25	89.347	0.004	0.542	0.01	203.013	4.003	18
longitudina	0.25	89.484	0.004	0.424	0.009	180.289	4.28	18
longitudina	1.25	89.463	0.003	0.433	0.008	245.154	4.769	18
longitudina	2.25	89.446	0.003	0.43	0.008	235.629	4.705	18
longitudina	3.25	89.436	0.004	0.457	0.008	221.815	4.488	18
longitudina	4.25	89.429	0.004	0.477	0.009	217.862	4.378	18
longitudina	5.25	89.410	0.003	0.435	0.008	242.358	4.752	18
longitudina	6.25	89.373	0.003	0.427	0.008	246.691	4.865	18
longitudina	7.25	89.332	0.003	0.394	0.007	262.469	5.19	18
longitudina	8.25	89.306	0.003	0.433	0.008	235.826	4.711	18
longitudina	9.25	89.313	0.004	0.461	0.009	210.765	4.393	18
longitudina	10.25	89.358	0.005	0.56	0.011	187.793	3.82	18
longitudina	11.25	89.405	0.005	0.591	0.011	186.897	3.71	18
longitudina	0.25	89.785	0.004	0.341	0.008	183.55	4.874	18
longitudina	1.25	89.721	0.002	0.341	0.005	333.825	6.127	18
longitudina	2.25	89.699	0.003	0.353	0.006	331.566	6.044	18
longitudina	3.25	89.698	0.003	0.354	0.006	311.867	5.859	18
longitudina	4.25	89.697	0.003	0.346	0.006	305.492	5.887	18
longitudina	5.25	89.697	0.003	0.359	0.006	298.419	5.749	18
longitudina	6.25	89.698	0.003	0.347	0.006	308.672	5.961	18
longitudina	7.25	89.692	0.003	0.337	0.006	317.177	6.124	18
longitudina	8.25	89.701	0.003	0.367	0.006	306.414	5.771	18

longitudina	9.25	89.697	0.003	0.353	0.005	329.998	5.998	18
longitudina	10.25	89.700	0.003	0.351	0.005	333.577	6.063	18
longitudina	11.25	89.696	0.002	0.356	0.005	338.948	6.023	18
longitudina	0.25	89.582	0.005	0.345	0.011	127.059	4.258	18
longitudina	1.25	89.534	0.003	0.364	0.006	279.771	5.458	18
longitudina	2.25	89.525	0.003	0.366	0.006	305.094	5.67	18
longitudina	3.25	89.528	0.003	0.36	0.006	309.95	5.759	18
longitudina	4.25	89.525	0.003	0.355	0.006	297.904	5.77	18
longitudina	5.25	89.525	0.003	0.356	0.006	295.87	5.708	18
longitudina	6.25	89.515	0.003	0.372	0.006	289.133	5.527	18
longitudina	7.25	89.501	0.003	0.349	0.006	300.997	5.808	18
longitudina	8.25	89.486	0.003	0.371	0.006	297.298	5.583	18
longitudina	9.25	89.469	0.003	0.362	0.006	312.996	5.763	18
longitudina	10.25	89.464	0.003	0.356	0.006	301.363	5.726	18
longitudina	11.25	89.464	0.003	0.375	0.006	307.576	5.609	18
longitudina	0.25	89.525	0.005	0.368	0.012	117.745	4.017	18
longitudina	1.25	89.493	0.003	0.394	0.007	272.78	5.19	18
longitudina	2.25	89.494	0.003	0.41	0.007	278.226	5.137	18
longitudina	3.25	89.501	0.003	0.386	0.006	281.531	5.343	18
longitudina	4.25	89.495	0.003	0.378	0.007	270.57	5.322	18
longitudina	5.25	89.481	0.003	0.378	0.007	268.881	5.342	18
longitudina	6.25	89.467	0.003	0.39	0.007	262.163	5.206	18
longitudina	7.25	89.426	0.003	0.398	0.007	260.7	5.129	18
longitudina	8.25	89.410	0.003	0.4	0.007	262.111	5.105	18
longitudina	9.25	89.413	0.003	0.405	0.007	245.023	4.94	18
longitudina	10.25	89.438	0.004	0.496	0.009	202.881	4.211	18
longitudina	11.25	89.452	0.005	0.568	0.012	179.643	3.823	18
longitudina	-64	89.614	0.003	0.372	0.006	280.693	5.485	18
longitudina	-60	89.621	0.003	0.377	0.006	273.869	5.378	18
longitudina	-56	89.602	0.003	0.376	0.006	280.304	5.452	18
longitudina	-52	89.588	0.003	0.368	0.006	280.581	5.507	18
longitudina	-48	89.609	0.003	0.353	0.006	289.285	5.696	18
longitudina	-44	89.655	0.003	0.371	0.006	293.965	5.627	18
longitudina	-40	89.708	0.003	0.362	0.006	297.641	5.702	18
longitudina	-36	89.746	0.003	0.364	0.006	289.011	5.66	18
longitudina	-32	89.762	0.003	0.355	0.006	311.738	5.934	18
longitudina	-28	89.761	0.003	0.365	0.006	297.485	5.72	18
longitudina	-24	89.760	0.003	0.352	0.006	284.531	5.725	18
longitudina	-20	89.745	0.003	0.362	0.006	292.374	5.723	18
longitudina	-16	89.707	0.003	0.355	0.006	297.553	5.808	18
longitudina	-14	89.639	0.003	0.381	0.007	268.323	5.323	18
longitudina	-12	89.568	0.003	0.38	0.007	276.474	5.388	18
longitudina	-10	89.542	0.003	0.37	0.006	283.952	5.519	18
longitudina	-8	89.506	0.003	0.395	0.007	259.599	5.146	18
longitudina	-6	89.427	0.003	0.435	0.008	238.656	4.737	18
longitudina	-4	89.371	0.003	0.423	0.007	249.83	4.907	18
longitudina	-2	89.358	0.003	0.421	0.007	265.007	5.011	18
longitudina	0	89.374	0.003	0.41	0.007	256.102	5.005	18
longitudina	2	89.379	0.003	0.43	0.008	239.821	4.788	18
longitudina	4	89.470	0.003	0.372	0.007	269.772	5.357	18
longitudina	6	89.500	0.003	0.364	0.006	286.898	5.546	18
longitudina	8	89.530	0.003	0.359	0.006	304.819	5.75	18

Detector #4

longitudina	10	89.565	0.003	0.364	0.006	290.608	5.621	18
longitudina	12	89.610	0.003	0.354	0.006	293.856	5.706	18
longitudina	14	89.656	0.003	0.348	0.006	298.207	5.823	18
longitudina	16	89.682	0.003	0.366	0.006	302.534	5.737	18
longitudina	20	89.713	0.003	0.351	0.006	301.502	5.825	18
longitudina	24	89.715	0.003	0.356	0.006	300.878	5.819	18
longitudina	28	89.712	0.003	0.355	0.006	300.133	5.838	18
longitudina	32	89.702	0.003	0.357	0.006	304.136	5.827	18
longitudina	36	89.707	0.003	0.348	0.006	309.941	5.979	18
longitudina	40	89.703	0.003	0.351	0.006	312.766	5.918	18
longitudina	44	89.697	0.003	0.358	0.006	306.325	5.816	18
longitudina	48	89.688	0.003	0.357	0.006	305.623	5.81	18
longitudina	52	89.685	0.003	0.341	0.006	314.527	6.005	18
longitudina	56	89.671	0.003	0.37	0.006	294.687	5.593	18
longitudina	60	89.621	0.003	0.37	0.006	302.293	5.675	18
longitudina	64	89.578	0.003	0.362	0.006	292.253	5.61	18

Ferritic Steel D0 Comb-like Sample

direction	Position (mm)	2Θ / d / a [° / A]	uncertainty	FWHM [°]	uncertainty [°]	Peak Height	uncertainty	sampling time (min.)
normal	0.25	89.613	0.006	0.403	0.015	132.2	4.718	50
normal	1.25	89.627	0.005	0.377	0.012	142.55	4.433	30
normal	2.25	89.628	0.006	0.425	0.015	85.443	3.104	15
normal	3.25	89.62	0.005	0.371	0.011	110.71	3.541	12
normal	4.25	89.623	0.005	0.409	0.01	115.98	3.337	10
normal	5.25	89.623	0.004	0.385	0.009	130.03	3.52	8
normal	6.25	89.63	0.003	0.4	0.007	182.76	4.048	9
normal	7.25	89.624	0.003	0.396	0.006	255.43	4.717	10
normal	8.25	89.628	0.002	0.406	0.005	351.49	5.448	12
normal	9.25	89.62	0.002	0.406	0.004	553.62	6.756	15
normal	10.25	89.618	0.001	0.396	0.002	1442.1	10.871	30
normal	11.25	89.626	0.001	0.402	0.002	2922.3	15.315	50
normal	0.25	89.617	0.008	0.703	0.019	146.48	3.737	50
normal	1.25	89.633	0.006	0.556	0.015	134.92	3.667	30
normal	2.25	89.61	0.006	0.458	0.013	110.65	3.313	15
normal	3.25	89.624	0.005	0.466	0.012	108.45	3.161	12
normal	4.25	89.625	0.005	0.454	0.01	128.88	3.334	10
normal	5.25	89.63	0.004	0.442	0.009	132.41	3.34	8
normal	6.25	89.634	0.003	0.426	0.008	186.89	3.97	9
normal	7.25	89.64	0.003	0.443	0.007	237.99	4.331	10
normal	8.25	89.639	0.002	0.429	0.005	357.17	5.353	12
normal	9.25	89.636	0.002	0.444	0.004	537.51	6.414	15
normal	10.25	89.638	0.001	0.44	0.002	1428.3	10.322	30
normal	11.25	89.639	0.001	0.448	0.002	2651	13.901	50
normal	0.25	89.636	0.005	0.561	0.012	215.84	4.572	50
normal	1.25	89.629	0.005	0.578	0.012	179.76	3.871	30
normal	2.25	89.609	0.006	0.561	0.014	109.81	2.973	15
normal	3.25	89.634	0.005	0.505	0.012	118.59	3.114	12
normal	4.25	89.613	0.004	0.453	0.01	134.85	3.371	10
normal	5.25	89.628	0.005	0.522	0.011	122.23	2.965	8
normal	6.25	89.632	0.004	0.513	0.009	168.65	3.469	9
normal	7.25	89.647	0.004	0.536	0.008	201.56	3.689	10
normal	8.25	89.653	0.003	0.499	0.006	315.42	4.707	12
normal	9.25	89.634	0.002	0.488	0.005	501.95	5.92	15
normal	10.25	89.643	0.001	0.462	0.003	1338.5	9.808	30
normal	11.25	89.636	0.001	0.469	0.002	2434	13.102	50
normal	0.25	89.629	0.006	0.72	0.014	218.71	4.102	50
normal	1.25	89.618	0.005	0.639	0.013	179.83	3.717	30
normal	2.25	89.624	0.005	0.518	0.012	137.6	3.391	15
normal	3.25	89.619	0.004	0.473	0.01	154.58	3.569	12
normal	4.25	89.627	0.005	0.512	0.011	126.44	3.124	10
normal	5.25	89.632	0.005	0.502	0.01	138.2	3.21	9
normal	6.25	89.635	0.004	0.493	0.009	154.36	3.387	8
normal	7.25	89.639	0.005	0.508	0.01	129.36	3.009	6
normal	8.25	89.633	0.005	0.534	0.011	106.67	2.636	4
normal	9.25	89.615	0.004	0.509	0.01	117.71	2.806	3.5
normal	10.25	89.639	0.004	0.481	0.009	130.74	3.023	3

Detector #4

normal	11.25	89.624	0.004	0.472	0.008	132.05	3.037	3
normal	0.25	89.61	0.008	0.792	0.019	154.448	3.539	50
normal	1.25	89.618	0.007	0.667	0.017	135.136	3.333	30
normal	2.25	89.618	0.005	0.516	0.013	123.655	3.243	15
normal	3.25	89.633	0.005	0.481	0.012	120.498	3.216	12
normal	4.25	89.64	0.005	0.502	0.011	124.552	3.12	10
normal	5.25	89.631	0.004	0.465	0.009	152.543	3.507	9
normal	6.25	89.626	0.004	0.482	0.008	173.398	3.561	8
normal	7.25	89.637	0.004	0.497	0.009	142.793	3.185	6
normal	8.25	89.63	0.004	0.454	0.009	115.815	2.968	4
normal	9.25	89.634	0.004	0.433	0.008	141.909	3.323	3.5
normal	10.25	89.639	0.004	0.452	0.007	152.839	3.309	3
normal	11.25	89.636	0.004	0.465	0.008	129.356	3.02	3
normal	0.25	89.629	0.004	0.414	0.009	260.418	5.618	50
normal	1.25	89.621	0.004	0.436	0.009	215.826	4.739	30
normal	2.25	89.615	0.004	0.426	0.01	150.061	3.82	15
normal	3.25	89.64	0.004	0.431	0.009	148.344	3.645	12
normal	4.25	89.639	0.004	0.415	0.009	156.212	3.769	10
normal	5.25	89.631	0.004	0.422	0.008	162.521	3.767	9
normal	6.25	89.629	0.003	0.418	0.007	191.123	4.009	8
normal	7.25	89.635	0.004	0.414	0.007	164.472	3.68	6
normal	8.25	89.64	0.004	0.433	0.008	125.406	3.119	4
normal	9.25	89.626	0.004	0.421	0.008	141.024	3.37	3.5
normal	10.25	89.626	0.003	0.412	0.007	158.569	3.521	3
normal	11.25	89.632	0.004	0.45	0.008	143.411	3.235	3
normal	0.25	89.62	0.006	0.411	0.014	148.481	4.841	50
normal	1.25	89.629	0.005	0.406	0.012	142.919	4.302	30
normal	2.25	89.623	0.005	0.379	0.012	105.611	3.548	15
normal	3.25	89.62	0.005	0.405	0.011	109.326	3.362	12
normal	4.25	89.637	0.005	0.419	0.01	120.228	3.348	10
normal	5.25	89.632	0.004	0.415	0.009	147.078	3.601	9
normal	6.25	89.629	0.004	0.408	0.008	166.607	3.814	8
normal	7.25	89.63	0.004	0.399	0.007	158.788	3.702	6
normal	8.25	89.627	0.004	0.388	0.008	135.058	3.409	4
normal	9.25	89.618	0.004	0.397	0.007	142.032	3.421	3.5
normal	10.25	89.616	0.003	0.394	0.007	147.689	3.491	3
normal	11.25	89.634	0.003	0.417	0.006	182.317	3.729	3

Detector #5
Ferritic Steel Weld Plate

direction	Position (mm)	2Θ / d / a [° / A]	uncertainty	FWHM [°]	uncertainty [°]	Peak Height	uncertainty	sampling time
normal	0.25	89.507	0.008	0.465	0.019	77.063	3.097	18
normal	1.25	89.518	0.005	0.406	0.011	126.38	3.744	15
normal	2.25	89.52	0.005	0.433	0.011	117.98	3.348	10
normal	3.25	89.524	0.004	0.425	0.009	148.63	3.646	9
normal	4.25	89.532	0.004	0.427	0.009	146.61	3.498	6
normal	5.25	89.534	0.005	0.416	0.01	98.466	2.872	3
normal	6.25	89.542	0.003	0.417	0.007	176.57	3.795	4
normal	7.25	89.538	0.002	0.413	0.005	372.25	5.403	6
normal	8.25	89.541	0.002	0.409	0.003	763.76	7.719	9
normal	9.25	89.546	0.001	0.409	0.003	1128.6	9.289	10
normal	10.25	89.548	0.001	0.408	0.002	2230.3	12.968	15
normal	11.25	89.546	0.001	0.412	0.001	3433.5	15.942	18
normal	0.25	89.591	0.008	0.459	0.019	79.775	3.181	18
normal	1.25	89.599	0.005	0.422	0.011	134.87	3.768	15
normal	2.25	89.607	0.005	0.454	0.011	123.73	3.349	10
normal	3.25	89.6	0.004	0.431	0.009	154.31	3.742	9
normal	4.25	89.591	0.004	0.427	0.009	141.67	3.47	6
normal	5.25	89.583	0.005	0.423	0.01	101.25	2.865	3
normal	6.25	89.566	0.003	0.427	0.007	180.49	3.761	4
normal	7.25	89.565	0.002	0.426	0.005	367.57	5.349	6
normal	8.25	89.568	0.002	0.418	0.003	744.43	7.607	9
normal	9.25	89.588	0.001	0.42	0.003	1097.3	9.1	10
normal	10.25	89.614	0.001	0.417	0.002	2141.1	12.681	15
normal	11.25	89.644	0.001	0.418	0.001	3423	15.942	18
normal	0.25	89.635	0.01	0.6	0.025	67.281	2.673	18
normal	1.25	89.652	0.007	0.608	0.018	99.198	2.88	15
normal	2.25	89.66	0.008	0.692	0.019	86.317	2.421	10
normal	3.25	89.66	0.006	0.524	0.013	116.28	3.11	9
normal	4.25	89.66	0.004	0.464	0.009	138.21	3.325	6
normal	5.25	89.626	0.005	0.472	0.012	91.542	2.64	3
normal	6.25	89.597	0.004	0.482	0.008	163.69	3.443	4
normal	7.25	89.572	0.003	0.489	0.006	330.85	4.747	6
normal	8.25	89.572	0.002	0.465	0.004	675.23	6.894	9
normal	9.25	89.595	0.001	0.453	0.003	1028.2	8.532	10
normal	10.25	89.642	0.001	0.448	0.002	2001.6	11.898	15
normal	11.25	89.679	0.001	0.441	0.002	3139.2	14.968	18
normal	0.25	89.557	0.009	0.746	0.022	89.467	2.585	18
normal	1.25	89.598	0.008	0.654	0.017	103.18	2.797	15
normal	2.25	89.649	0.006	0.543	0.014	109.79	2.973	10
normal	3.25	89.673	0.004	0.483	0.009	167.38	3.662	9
normal	4.25	89.656	0.004	0.493	0.01	145.39	3.327	6
normal	5.25	89.63	0.006	0.513	0.012	89.273	2.509	3
normal	6.25	89.581	0.004	0.498	0.008	164.04	3.396	4
normal	7.25	89.562	0.003	0.535	0.006	306.58	4.412	6
normal	8.25	89.563	0.002	0.548	0.004	593.47	6.033	9
normal	9.25	89.613	0.002	0.52	0.003	900.88	7.521	10
normal	10.25	89.667	0.001	0.471	0.002	1929.7	11.488	15

normal	11.25	89.699	0.001	0.464	0.002	2979.434	14.272	18
normal	0.25	89.544	0.01	0.74	0.024	86.294	2.606	18
normal	1.25	89.557	0.008	0.701	0.019	99.046	2.696	15
normal	2.25	89.626	0.008	0.66	0.019	88.969	2.533	10
normal	3.25	89.658	0.005	0.51	0.011	143.044	3.351	9
normal	4.25	89.668	0.004	0.476	0.01	141.817	3.332	6
normal	5.25	89.601	0.006	0.529	0.012	90.174	2.463	3
normal	6.25	89.54	0.004	0.514	0.008	165.156	3.329	4
normal	7.25	89.527	0.003	0.515	0.006	329.343	4.645	6
normal	8.25	89.53	0.002	0.52	0.004	627.875	6.331	9
normal	9.25	89.58	0.002	0.488	0.003	955.383	7.985	10
normal	10.25	89.642	0.001	0.465	0.002	1983.007	11.685	15
normal	11.25	89.684	0.001	0.461	0.002	3123.606	14.618	18
normal	0.25	89.541	0.007	0.477	0.017	92.839	3.272	18
normal	1.25	89.57	0.005	0.463	0.012	128.617	3.566	15
normal	2.25	89.598	0.005	0.421	0.01	135.259	3.617	10
normal	3.25	89.636	0.004	0.447	0.009	159.036	3.727	9
normal	4.25	89.635	0.004	0.431	0.009	155.166	3.637	6
normal	5.25	89.605	0.005	0.433	0.01	103.578	2.868	3
normal	6.25	89.588	0.003	0.455	0.007	182.677	3.685	4
normal	7.25	89.57	0.002	0.44	0.005	368.903	5.258	6
normal	8.25	89.566	0.002	0.436	0.003	735.111	7.398	9
normal	9.25	89.586	0.001	0.436	0.003	1070.866	8.837	10
normal	10.25	89.616	0.001	0.433	0.002	2110.795	12.381	15
normal	11.25	89.654	0.001	0.435	0.002	3205.347	15.158	18
normal	0.25	89.459	0.022	0.379	0.056	5.998	0.842	1
normal	1.25	89.494	0.03	0.327	0.086	6.166	1.152	1
normal	2.25	89.555	0.013	0.448	0.028	16.918	1.184	1.5
normal	3.25	89.539	0.009	0.409	0.021	27.189	1.549	1.5
normal	4.25	89.535	0.006	0.395	0.013	51.553	2.103	2
normal	5.25	89.532	0.005	0.406	0.01	100.088	2.909	3
normal	6.25	89.54	0.003	0.425	0.007	179.911	3.762	4
normal	7.25	89.545	0.002	0.414	0.005	371.876	5.416	6
normal	8.25	89.545	0.002	0.405	0.003	774.595	7.798	9
normal	9.25	89.55	0.001	0.406	0.002	1145.453	9.377	10
normal	10.25	89.547	0.001	0.405	0.002	2269.379	13.136	15
normal	11.25	89.544	0.001	0.41	0.001	3608.364	16.342	18
normal	-64	89.53	0.003	0.409	0.007	197.379	4.007	4
normal	-60	89.535	0.003	0.417	0.007	202.595	3.996	4
normal	-56	89.515	0.003	0.417	0.006	210	4.086	4
normal	-52	89.514	0.003	0.415	0.007	208.735	4.069	4
normal	-48	89.5	0.003	0.409	0.006	206.207	4.089	4
normal	-44	89.491	0.003	0.4	0.006	213.311	4.196	4
normal	-40	89.49	0.003	0.418	0.006	209.805	4.065	4
normal	-36	89.488	0.003	0.411	0.006	208.522	4.088	4
normal	-32	89.502	0.003	0.395	0.006	211.173	4.198	4
normal	-28	89.502	0.003	0.419	0.006	206.305	4.024	4
normal	-24	89.497	0.003	0.399	0.006	213.167	4.191	4
normal	-20	89.506	0.003	0.42	0.006	207.682	4.036	4
normal	-16	89.523	0.003	0.416	0.006	207.8	4.063	4
normal	-14	89.53	0.003	0.411	0.007	199.355	4.02	4
normal	-12	89.535	0.003	0.436	0.007	196.149	3.873	4

normal	-10	89.534	0.003	0.449	0.007	194.82	3.835	4
normal	-8	89.555	0.004	0.503	0.008	168.263	3.41	4
normal	-6	89.553	0.004	0.527	0.008	182.824	3.46	4
normal	-4	89.538	0.004	0.512	0.008	181.818	3.477	4
normal	-2	89.505	0.004	0.53	0.008	183.675	3.449	4
normal	0	89.513	0.004	0.518	0.008	185.546	3.508	4
normal	2	89.539	0.003	0.447	0.007	197.793	3.866	4
normal	4	89.548	0.003	0.436	0.007	202.757	3.948	4
normal	6	89.554	0.003	0.419	0.006	208.363	4.055	4
normal	8	89.529	0.003	0.424	0.007	195.981	3.936	4
normal	10	89.503	0.003	0.415	0.006	216.007	4.123	4
normal	12	89.5	0.003	0.414	0.006	211.651	4.108	4
normal	14	89.501	0.003	0.401	0.006	221.947	4.257	4
normal	16	89.502	0.003	0.415	0.006	211.832	4.091	4
normal	20	89.505	0.003	0.409	0.006	215.34	4.155	4
normal	24	89.504	0.003	0.42	0.006	205.688	4.001	4
normal	28	89.507	0.003	0.404	0.006	220.795	4.232	4
normal	32	89.506	0.003	0.406	0.006	214.776	4.166	4
normal	36	89.509	0.003	0.399	0.006	215.093	4.201	4
normal	40	89.505	0.003	0.411	0.006	205.828	4.054	4
normal	44	89.509	0.003	0.414	0.006	205.009	4.013	4
normal	48	89.51	0.003	0.411	0.006	202.865	4.025	4
normal	52	89.522	0.003	0.404	0.006	205.078	4.096	4
normal	56	89.538	0.003	0.396	0.006	209.353	4.181	4
normal	60	89.547	0.003	0.403	0.006	206.483	4.078	4
normal	64	89.519	0.002	0.418	0.005	333.856	5.027	4
transverse	0.25	89.506	0.004	0.408	0.007	167.137	3.719	5
transverse	1.25	89.505	0.003	0.408	0.007	183.787	3.889	5
transverse	2.25	89.506	0.003	0.414	0.007	186.211	3.894	5
transverse	3.25	89.508	0.003	0.407	0.007	191.275	3.991	5
transverse	4.25	89.512	0.003	0.423	0.007	193.852	3.965	5
transverse	5.25	89.508	0.003	0.413	0.007	205.235	4.102	5
transverse	6.25	89.514	0.003	0.415	0.006	216.529	4.16	5
transverse	7.25	89.513	0.003	0.406	0.006	226.086	4.294	5
transverse	8.25	89.505	0.003	0.418	0.006	218.516	4.192	5
transverse	9.25	89.507	0.003	0.419	0.006	223.227	4.19	5
transverse	10.25	89.503	0.003	0.408	0.006	231.611	4.307	5
transverse	11.25	89.511	0.004	0.44	0.009	126.507	3.206	5
transverse	0.25	89.528	0.004	0.516	0.009	144.781	3.177	5
transverse	1.25	89.539	0.004	0.455	0.008	174.527	3.635	5
transverse	2.25	89.561	0.003	0.446	0.007	185.957	3.764	5
transverse	3.25	89.582	0.003	0.453	0.007	187.572	3.778	5
transverse	4.25	89.616	0.004	0.455	0.008	178.564	3.707	5
transverse	5.25	89.649	0.004	0.449	0.008	178.014	3.71	5
transverse	6.25	89.656	0.004	0.454	0.008	179.973	3.735	5
transverse	7.25	89.671	0.004	0.447	0.008	179.234	3.736	5
transverse	8.25	89.646	0.004	0.44	0.007	179.704	3.745	5
transverse	9.25	89.559	0.003	0.441	0.007	189.828	3.834	5
transverse	10.25	89.448	0.003	0.45	0.007	191.899	3.812	5
transverse	11.25	89.36	0.004	0.465	0.009	131.622	3.182	5
transverse	0.25	89.58	0.005	0.568	0.01	146.732	3.032	5
transverse	1.25	89.533	0.004	0.559	0.01	151.407	3.109	5

transverse	2.25	89.534	0.004	0.541	0.009	152.885	3.172	5
transverse	3.25	89.563	0.004	0.52	0.009	155.052	3.252	5
transverse	4.25	89.617	0.004	0.523	0.009	148.792	3.187	5
transverse	5.25	89.711	0.004	0.501	0.01	148.902	3.33	5
transverse	6.25	89.779	0.004	0.528	0.009	156.561	3.272	5
transverse	7.25	89.797	0.004	0.542	0.009	156.589	3.23	5
transverse	8.25	89.708	0.004	0.512	0.009	172.849	3.466	5
transverse	9.25	89.534	0.004	0.51	0.008	176.124	3.466	5
transverse	10.25	89.388	0.003	0.458	0.007	190.988	3.786	5
transverse	11.25	89.314	0.005	0.485	0.01	115.976	2.98	5
transverse	0.25	89.608	0.006	0.697	0.014	106.647	2.397	5
transverse	1.25	89.548	0.005	0.61	0.011	126.572	2.756	5
transverse	2.25	89.455	0.004	0.524	0.009	154.447	3.22	5
transverse	3.25	89.484	0.004	0.52	0.009	160.835	3.274	5
transverse	4.25	89.615	0.004	0.549	0.01	150.583	3.13	5
transverse	5.25	89.73	0.004	0.486	0.009	171.517	3.58	5
transverse	6.25	89.804	0.004	0.528	0.008	179.818	3.469	5
transverse	7.25	89.829	0.004	0.513	0.008	188.484	3.583	5
transverse	8.25	89.742	0.004	0.532	0.008	182.969	3.469	5
transverse	9.25	89.539	0.004	0.536	0.008	188.473	3.497	5
transverse	10.25	89.404	0.003	0.476	0.007	205.901	3.818	5
transverse	11.25	89.349	0.005	0.489	0.01	129.083	3.12	5
transverse	0.25	89.576	0.007	0.778	0.016	95.766	2.177	5
transverse	1.25	89.553	0.007	0.721	0.016	96.98	2.317	5
transverse	2.25	89.463	0.005	0.518	0.01	140.994	3.199	5
transverse	3.25	89.452	0.004	0.481	0.008	162.941	3.461	5
transverse	4.25	89.591	0.004	0.519	0.01	148.44	3.225	5
transverse	5.25	89.693	0.004	0.498	0.009	169.002	3.487	5
transverse	6.25	89.742	0.004	0.485	0.008	181.217	3.621	5
transverse	7.25	89.757	0.004	0.476	0.008	187.574	3.721	5
transverse	8.25	89.7	0.003	0.46	0.007	205.253	3.942	5
transverse	9.25	89.58	0.003	0.445	0.007	210.831	4.03	5
transverse	10.25	89.462	0.003	0.452	0.007	217.703	4.024	5
transverse	11.25	89.378	0.004	0.469	0.009	158.213	3.462	5
transverse	0.25	89.549	0.003	0.41	0.007	175.682	3.813	5
transverse	1.25	89.527	0.004	0.428	0.007	171.956	3.692	5
transverse	2.25	89.534	0.004	0.434	0.008	172.98	3.712	5
transverse	3.25	89.558	0.003	0.434	0.007	183.57	3.815	5
transverse	4.25	89.599	0.004	0.438	0.008	184.249	3.805	5
transverse	5.25	89.633	0.003	0.439	0.007	199.283	3.987	5
transverse	6.25	89.65	0.003	0.428	0.007	198.719	4.021	5
transverse	7.25	89.651	0.003	0.428	0.007	209.725	4.124	5
transverse	8.25	89.626	0.003	0.418	0.006	220.38	4.227	5
transverse	9.25	89.572	0.003	0.419	0.006	221.558	4.2	5
transverse	10.25	89.499	0.003	0.424	0.006	233.82	4.262	5
transverse	11.25	89.432	0.004	0.438	0.008	163.546	3.608	5
transverse	0.25	89.524	0.003	0.407	0.007	175.416	3.801	5
transverse	1.25	89.527	0.003	0.397	0.007	189.149	4.036	5
transverse	2.25	89.522	0.003	0.395	0.007	193.514	4.065	5
transverse	3.25	89.518	0.003	0.404	0.007	195.307	4.041	5
transverse	4.25	89.523	0.003	0.393	0.007	200.662	4.175	5
transverse	5.25	89.524	0.003	0.411	0.007	200.755	4.05	5

transverse	6.25	89.517	0.003	0.413	0.007	201.305	4.059	5
transverse	7.25	89.516	0.003	0.41	0.006	219.751	4.242	5
transverse	8.25	89.519	0.003	0.397	0.006	225.732	4.331	5
transverse	9.25	89.517	0.003	0.401	0.006	237.382	4.411	5
transverse	10.25	89.515	0.003	0.4	0.006	242.814	4.468	5
transverse	11.25	89.527	0.004	0.447	0.008	159.201	3.499	5
transverse	-64	89.555	0.003	0.404	0.007	202.73	4.161	5
transverse	-60	89.549	0.003	0.405	0.007	206.455	4.16	5
transverse	-56	89.535	0.003	0.402	0.007	201.361	4.116	5
transverse	-52	89.521	0.003	0.413	0.007	200.343	4.064	5
transverse	-48	89.511	0.003	0.404	0.007	200.093	4.063	5
transverse	-44	89.497	0.003	0.405	0.007	199.455	4.087	5
transverse	-40	89.503	0.003	0.413	0.007	207.332	4.104	5
transverse	-36	89.505	0.003	0.409	0.007	197.388	4.051	5
transverse	-32	89.512	0.003	0.395	0.007	196.824	4.135	5
transverse	-28	89.515	0.003	0.418	0.007	199.221	4.017	5
transverse	-24	89.548	0.003	0.408	0.007	195.266	4.03	5
transverse	-20	89.578	0.003	0.41	0.007	192.737	4.016	5
transverse	-16	89.604	0.003	0.411	0.007	202.267	4.083	5
transverse	-14	89.618	0.003	0.414	0.007	196.191	4.043	5
transverse	-12	89.639	0.003	0.438	0.007	192.247	3.892	5
transverse	-10	89.671	0.004	0.487	0.009	159.595	3.434	5
transverse	-8	89.701	0.004	0.512	0.01	143.075	3.197	5
transverse	-6	89.719	0.004	0.519	0.009	162.22	3.347	5
transverse	-4	89.735	0.004	0.498	0.008	172.514	3.508	5
transverse	-2	89.742	0.004	0.525	0.009	166.142	3.38	5
transverse	0	89.723	0.004	0.508	0.009	162.329	3.406	5
transverse	2	89.677	0.004	0.467	0.008	179.331	3.685	5
transverse	4	89.644	0.003	0.443	0.007	188.321	3.848	5
transverse	6	89.621	0.003	0.421	0.007	195.771	4	5
transverse	8	89.602	0.003	0.403	0.007	205.028	4.184	5
transverse	10	89.574	0.003	0.396	0.007	208.14	4.251	5
transverse	12	89.544	0.003	0.404	0.007	199.444	4.125	5
transverse	14	89.533	0.003	0.401	0.007	207.278	4.174	5
transverse	16	89.519	0.003	0.409	0.007	199.349	4.109	5
transverse	20	89.519	0.003	0.417	0.007	193.889	3.987	5
transverse	24	89.516	0.003	0.409	0.007	201.75	4.092	5
transverse	28	89.522	0.003	0.411	0.007	202.748	4.088	5
transverse	32	89.523	0.004	0.419	0.008	181.878	3.885	5
transverse	36	89.518	0.003	0.416	0.007	206.222	4.12	5
transverse	40	89.523	0.003	0.4	0.007	202.774	4.166	5
transverse	44	89.521	0.003	0.407	0.007	203.131	4.104	5
transverse	48	89.532	0.003	0.42	0.007	197.603	4.018	5
transverse	52	89.542	0.003	0.392	0.007	202.664	4.201	5
transverse	56	89.562	0.003	0.399	0.007	201.654	4.16	5
transverse	60	89.582	0.003	0.412	0.007	192.354	4.011	5
transverse	64	89.598	0.003	0.413	0.005	285.836	4.806	5
longitudina	0.25	89.674	0.004	0.404	0.008	217.723	4.864	20
longitudina	1.25	89.646	0.003	0.418	0.006	335.293	5.658	20
longitudina	2.25	89.640	0.003	0.415	0.006	336.923	5.675	20
longitudina	3.25	89.629	0.003	0.42	0.006	314.824	5.495	20
longitudina	4.25	89.632	0.003	0.411	0.006	314.696	5.56	20

longitudina	5.25	89.632	0.003	0.414	0.006	315.399	5.554	20
longitudina	6.25	89.619	0.003	0.403	0.006	311.776	5.632	20
longitudina	7.25	89.625	0.003	0.413	0.006	313.708	5.547	20
longitudina	8.25	89.631	0.003	0.427	0.007	304.461	5.383	20
longitudina	9.25	89.625	0.003	0.411	0.006	335.306	5.716	20
longitudina	10.25	89.621	0.003	0.409	0.006	340.589	5.724	20
longitudina	11.25	89.621	0.003	0.412	0.006	342.111	5.728	20
longitudina	0.25	89.435	0.004	0.456	0.009	202.979	4.304	18
longitudina	1.25	89.433	0.003	0.454	0.007	270.169	4.826	18
longitudina	2.25	89.456	0.004	0.469	0.008	239.524	4.545	18
longitudina	3.25	89.447	0.003	0.453	0.008	249.433	4.699	18
longitudina	4.25	89.451	0.003	0.448	0.008	245.881	4.738	18
longitudina	5.25	89.440	0.004	0.473	0.008	240.431	4.568	18
longitudina	6.25	89.429	0.004	0.489	0.009	220.983	4.33	18
longitudina	7.25	89.420	0.004	0.497	0.009	225.93	4.344	18
longitudina	8.25	89.396	0.004	0.493	0.009	228.334	4.366	18
longitudina	9.25	89.407	0.004	0.511	0.009	223.441	4.21	18
longitudina	10.25	89.423	0.004	0.526	0.009	227.978	4.237	18
longitudina	11.25	89.433	0.004	0.524	0.009	219.264	4.185	18
longitudina	0.25	89.412	0.004	0.491	0.01	187.688	4.012	18
longitudina	1.25	89.412	0.004	0.507	0.008	235.704	4.326	18
longitudina	2.25	89.407	0.004	0.503	0.009	223.103	4.255	18
longitudina	3.25	89.395	0.004	0.525	0.01	206.728	4.068	18
longitudina	4.25	89.365	0.005	0.547	0.01	195.508	3.91	18
longitudina	5.25	89.334	0.004	0.533	0.01	205.174	4.011	18
longitudina	6.25	89.299	0.004	0.529	0.009	211.074	4.078	18
longitudina	7.25	89.290	0.004	0.528	0.009	210.114	4.045	18
longitudina	8.25	89.293	0.005	0.59	0.011	191.142	3.708	18
longitudina	9.25	89.284	0.005	0.641	0.012	179.696	3.467	18
longitudina	10.25	89.272	0.005	0.691	0.012	175.896	3.321	18
longitudina	11.25	89.262	0.005	0.62	0.011	196.381	3.648	18
longitudina	0.25	89.397	0.005	0.502	0.012	149.011	3.677	18
longitudina	1.25	89.395	0.004	0.489	0.009	214.533	4.228	18
longitudina	2.25	89.376	0.004	0.501	0.009	205.115	4.143	18
longitudina	3.25	89.357	0.004	0.526	0.01	203.3	4.056	18
longitudina	4.25	89.365	0.004	0.51	0.009	212.953	4.182	18
longitudina	5.25	89.350	0.004	0.51	0.009	218.725	4.222	18
longitudina	6.25	89.309	0.004	0.498	0.009	221.288	4.302	18
longitudina	7.25	89.253	0.004	0.488	0.009	222.09	4.309	18
longitudina	8.25	89.236	0.004	0.498	0.009	203.007	4.125	18
longitudina	9.25	89.258	0.005	0.551	0.011	187.67	3.828	18
longitudina	10.25	89.284	0.005	0.584	0.011	180.1	3.686	18
longitudina	11.25	89.330	0.005	0.656	0.012	184.067	3.482	18
longitudina	0.25	89.699	0.005	0.443	0.011	145.167	3.942	18
longitudina	1.25	89.636	0.003	0.422	0.007	280.674	5.176	18
longitudina	2.25	89.617	0.003	0.427	0.007	290.07	5.176	18
longitudina	3.25	89.616	0.003	0.427	0.007	275.153	5.094	18
longitudina	4.25	89.612	0.003	0.417	0.007	271.373	5.154	18
longitudina	5.25	89.614	0.003	0.434	0.007	261.026	4.968	18
longitudina	6.25	89.621	0.003	0.425	0.007	260.136	5.032	18
longitudina	7.25	89.619	0.003	0.431	0.007	257.681	4.966	18
longitudina	8.25	89.621	0.003	0.43	0.007	273.976	5.101	18

longitudina	9.25	89.615	0.003	0.434	0.007	273.015	5.042	18
longitudina	10.25	89.613	0.003	0.43	0.007	280.447	5.099	18
longitudina	11.25	89.615	0.003	0.423	0.007	295.356	5.263	18
longitudina	0.25	89.501	0.006	0.425	0.013	112.17	3.644	18
longitudina	1.25	89.458	0.003	0.422	0.007	260.411	4.941	18
longitudina	2.25	89.451	0.003	0.43	0.007	270.048	4.932	18
longitudina	3.25	89.451	0.003	0.422	0.007	266.849	5.011	18
longitudina	4.25	89.446	0.003	0.412	0.007	264.49	5.058	18
longitudina	5.25	89.435	0.003	0.423	0.007	258.289	4.946	18
longitudina	6.25	89.434	0.003	0.421	0.007	255.605	4.937	18
longitudina	7.25	89.421	0.003	0.426	0.007	258.62	4.916	18
longitudina	8.25	89.402	0.003	0.412	0.007	269.851	5.112	18
longitudina	9.25	89.391	0.003	0.42	0.007	279.572	5.075	18
longitudina	10.25	89.375	0.003	0.416	0.007	272.92	5.105	18
longitudina	11.25	89.372	0.003	0.431	0.007	279.616	5.029	18
longitudina	0.25	89.461	0.006	0.467	0.015	107.335	3.435	18
longitudina	1.25	89.413	0.003	0.439	0.008	243.893	4.716	18
longitudina	2.25	89.408	0.003	0.456	0.008	249.419	4.661	18
longitudina	3.25	89.417	0.003	0.436	0.007	251.403	4.808	18
longitudina	4.25	89.406	0.003	0.438	0.008	239.875	4.726	18
longitudina	5.25	89.404	0.004	0.435	0.008	233.522	4.669	18
longitudina	6.25	89.387	0.003	0.407	0.008	242.69	4.951	18
longitudina	7.25	89.356	0.003	0.414	0.008	245.134	4.907	18
longitudina	8.25	89.322	0.003	0.432	0.008	239.746	4.741	18
longitudina	9.25	89.330	0.004	0.471	0.009	213.663	4.366	18
longitudina	10.25	89.356	0.005	0.559	0.011	189.069	3.838	18
longitudina	11.25	89.363	0.005	0.63	0.012	177.504	3.542	18
longitudina	-64	89.539	0.003	0.445	0.007	260.471	4.838	18
longitudina	-60	89.540	0.003	0.453	0.008	251.079	4.762	18
longitudina	-56	89.532	0.003	0.452	0.007	257.28	4.784	18
longitudina	-52	89.514	0.003	0.44	0.007	252.333	4.822	18
longitudina	-48	89.528	0.003	0.41	0.007	276.351	5.184	18
longitudina	-44	89.576	0.003	0.417	0.007	264.788	5.116	18
longitudina	-40	89.624	0.003	0.406	0.007	282.815	5.363	18
longitudina	-36	89.660	0.003	0.421	0.007	269.962	5.137	18
longitudina	-32	89.669	0.003	0.418	0.007	267.025	5.159	18
longitudina	-28	89.679	0.003	0.439	0.007	273.351	5.042	18
longitudina	-24	89.683	0.003	0.432	0.008	250.026	4.929	18
longitudina	-20	89.662	0.003	0.434	0.007	264.7	5.011	18
longitudina	-16	89.626	0.003	0.436	0.007	266.294	5.002	18
longitudina	-14	89.562	0.004	0.481	0.008	237.615	4.488	18
longitudina	-12	89.491	0.004	0.465	0.008	242.904	4.615	18
longitudina	-10	89.458	0.004	0.464	0.008	230.744	4.536	18
longitudina	-8	89.417	0.004	0.49	0.009	222.774	4.328	18
longitudina	-6	89.358	0.004	0.538	0.01	201.654	4.007	18
longitudina	-4	89.296	0.004	0.531	0.01	203.562	4.021	18
longitudina	-2	89.285	0.004	0.484	0.008	238.686	4.467	18
longitudina	0	89.306	0.004	0.478	0.009	228.654	4.429	18
longitudina	2	89.311	0.004	0.506	0.009	210.404	4.165	18
longitudina	4	89.369	0.003	0.419	0.008	234.414	4.796	18
longitudina	6	89.394	0.004	0.445	0.008	229.533	4.621	18
longitudina	8	89.422	0.003	0.422	0.007	252.517	4.907	18

longitudina	10	89.447	0.003	0.423	0.007	261.626	4.981	18
longitudina	12	89.480	0.003	0.417	0.007	267.407	5.08	18
longitudina	14	89.527	0.003	0.402	0.006	282.838	5.269	18
longitudina	16	89.571	0.003	0.411	0.007	263.614	5.101	18
longitudina	20	89.606	0.003	0.417	0.007	257.23	5.077	18
longitudina	24	89.634	0.003	0.414	0.007	262.149	5.1	18
longitudina	28	89.627	0.003	0.432	0.007	254.849	4.95	18
longitudina	32	89.626	0.003	0.423	0.007	263.457	5.074	18
longitudina	36	89.621	0.003	0.439	0.007	267.547	4.985	18
longitudina	40	89.621	0.003	0.434	0.007	266.421	5.026	18
longitudina	44	89.619	0.003	0.431	0.007	260.811	5.013	18
longitudina	48	89.609	0.003	0.413	0.007	270.656	5.183	18
longitudina	52	89.607	0.003	0.419	0.007	260.256	5.055	18
longitudina	56	89.604	0.003	0.432	0.007	259.882	4.994	18
longitudina	60	89.588	0.003	0.433	0.007	252.222	4.899	18
longitudina	64	89.535	0.003	0.464	0.008	248.796	4.683	18

Ferritic Steel d-zero Comb-like Sample

direction	Position (mm)	2Θ / d / a [° / A]	uncertainty	FWHM [°]	uncertainty [°]	Peak Height	uncertainty	sampling time (min.)
normal	0.25	89.538	0.004	0.435	0.01	228.897	5.282	50
normal	1.25	89.539	0.004	0.4	0.008	235.764	5.079	30
normal	2.25	89.548	0.005	0.444	0.011	135.475	3.58	15
normal	3.25	89.541	0.004	0.4	0.009	144.673	3.751	12
normal	4.25	89.551	0.004	0.414	0.009	150.096	3.669	10
normal	5.25	89.556	0.004	0.41	0.008	149.302	3.603	8
normal	6.25	89.549	0.003	0.412	0.007	199.703	4.116	9
normal	7.25	89.544	0.003	0.392	0.006	264.513	4.782	10
normal	8.25	89.548	0.002	0.401	0.005	377.598	5.581	12
normal	9.25	89.544	0.002	0.406	0.004	563.09	6.712	15
normal	10.25	89.54	0.001	0.407	0.002	1384.881	10.48	30
normal	11.25	89.55	0.001	0.409	0.002	3066.647	15.334	50
normal	0.25	89.523	0.006	0.707	0.014	214.435	4.125	50
normal	1.25	89.54	0.005	0.592	0.012	196.562	3.994	30
normal	2.25	89.537	0.005	0.482	0.01	153.624	3.603	15
normal	3.25	89.543	0.004	0.465	0.009	161.303	3.643	12
normal	4.25	89.545	0.004	0.457	0.009	162.81	3.605	10
normal	5.25	89.559	0.004	0.444	0.008	160.361	3.573	8
normal	6.25	89.559	0.003	0.447	0.007	208.072	4.055	9
normal	7.25	89.562	0.003	0.43	0.006	277.222	4.699	10
normal	8.25	89.567	0.002	0.442	0.005	358.559	5.259	12
normal	9.25	89.564	0.002	0.446	0.004	552.232	6.402	15
normal	10.25	89.564	0.001	0.436	0.002	1386.561	10.172	30
normal	11.25	89.565	0.001	0.458	0.002	2471.261	13.259	50
normal	0.25	89.54	0.004	0.566	0.008	359.636	5.348	50
normal	1.25	89.534	0.004	0.574	0.009	272.622	4.477	30
normal	2.25	89.536	0.005	0.585	0.011	157.646	3.294	15
normal	3.25	89.555	0.005	0.524	0.01	157.035	3.391	12
normal	4.25	89.564	0.004	0.481	0.009	157.907	3.476	10
normal	5.25	89.556	0.004	0.475	0.009	147.908	3.335	8
normal	6.25	89.553	0.004	0.547	0.009	178.856	3.424	9
normal	7.25	89.567	0.004	0.524	0.008	220.568	3.895	10
normal	8.25	89.567	0.003	0.512	0.006	326.463	4.716	12
normal	9.25	89.557	0.002	0.491	0.005	508.104	5.897	15
normal	10.25	89.565	0.001	0.468	0.003	1287.528	9.541	30
normal	11.25	89.559	0.001	0.481	0.002	2323.083	12.599	50
normal	0.25	89.54	0.004	0.69	0.009	353.936	4.856	50
normal	1.25	89.536	0.004	0.615	0.009	271.887	4.358	30
normal	2.25	89.54	0.004	0.52	0.009	192.894	3.807	15
normal	3.25	89.552	0.004	0.476	0.008	193.868	3.886	12
normal	4.25	89.56	0.004	0.493	0.009	170.217	3.546	10
normal	5.25	89.561	0.004	0.498	0.009	167.66	3.471	9
normal	6.25	89.565	0.004	0.506	0.008	171.85	3.461	8
normal	7.25	89.571	0.004	0.515	0.009	142.332	3.124	6
normal	8.25	89.563	0.005	0.535	0.01	117.839	2.738	4
normal	9.25	89.563	0.004	0.507	0.01	121.171	2.837	3.5
normal	10.25	89.569	0.004	0.485	0.009	130.517	2.979	3

Detector #5

normal	11.25	89.561	0.004	0.486	0.009	124.399	2.891	3
normal	0.25	89.515	0.005	0.772	0.012	254.806	4.133	50
normal	1.25	89.528	0.005	0.692	0.012	207.405	3.734	30
normal	2.25	89.544	0.005	0.511	0.01	161.192	3.593	15
normal	3.25	89.558	0.004	0.513	0.01	160.601	3.46	12
normal	4.25	89.574	0.004	0.483	0.009	157.745	3.464	10
normal	5.25	89.568	0.004	0.49	0.008	180.347	3.621	9
normal	6.25	89.562	0.004	0.483	0.008	193.237	3.747	8
normal	7.25	89.562	0.004	0.471	0.008	164.167	3.428	6
normal	8.25	89.562	0.004	0.47	0.009	122.331	2.961	4
normal	9.25	89.558	0.004	0.444	0.008	138.063	3.194	3.5
normal	10.25	89.566	0.004	0.435	0.008	149.066	3.34	3
normal	11.25	89.568	0.004	0.466	0.009	128.008	3.013	3
normal	0.25	89.539	0.003	0.439	0.006	434.022	6.494	50
normal	1.25	89.541	0.003	0.441	0.006	350.549	5.6	30
normal	2.25	89.543	0.004	0.455	0.008	215.834	4.213	15
normal	3.25	89.558	0.004	0.428	0.008	196.626	4.111	12
normal	4.25	89.558	0.004	0.431	0.008	183.696	3.934	10
normal	5.25	89.558	0.003	0.437	0.008	190.873	3.919	9
normal	6.25	89.554	0.003	0.444	0.007	199.937	3.911	8
normal	7.25	89.559	0.004	0.438	0.008	168.633	3.61	6
normal	8.25	89.565	0.004	0.427	0.008	132.476	3.218	4
normal	9.25	89.559	0.004	0.43	0.008	140.729	3.238	3.5
normal	10.25	89.553	0.004	0.439	0.007	148.305	3.286	3
normal	11.25	89.558	0.004	0.456	0.008	138.716	3.14	3
normal	0.25	89.539	0.004	0.423	0.008	289.892	5.722	50
normal	1.25	89.539	0.004	0.401	0.008	241.126	5.124	30
normal	2.25	89.55	0.004	0.395	0.009	164.67	4.075	15
normal	3.25	89.548	0.004	0.415	0.009	162.956	3.839	12
normal	4.25	89.546	0.004	0.404	0.008	169.894	3.898	10
normal	5.25	89.557	0.003	0.417	0.008	183.573	3.952	9
normal	6.25	89.549	0.003	0.401	0.007	203.548	4.168	8
normal	7.25	89.558	0.003	0.413	0.007	174.801	3.74	6
normal	8.25	89.554	0.004	0.416	0.008	134.133	3.249	4
normal	9.25	89.544	0.004	0.401	0.007	142.627	3.381	3.5
normal	10.25	89.542	0.003	0.397	0.007	151.23	3.468	3
normal	11.25	89.553	0.003	0.4	0.006	181.656	3.777	3

Table III. Derived Strains and Stresses

E (GPa) 225 Possion ratio 0.3

line 1	Strains (microstrain)						Stresses (MPa)					
*l (mm)**	normal	error	transverse	error	longitudinal	error	normal	error	transverse	error	longitudinal	error
0.25	328	62	258	90	-619	145	53	29	40	34	-111	46
1.25	217	48	334	40	-608	78	30	19	50	17	-113	25
2.25	264	18	381	54	-549	130	58	19	78	24	-83	40
3.25	202	107	323	114	-624	174	22	42	43	43	-121	57
4.25	170	40	343	53	-563	111	23	20	53	22	-104	35
5.25	144	43	375	74	-555	137	20	24	60	29	-101	43
6.25	114	49	317	15	-589	111	-1	21	34	16	-123	34
7.25	103	65	308	40	-635	135	-11	27	24	23	-139	42
8.25	120	67	399	60	-611	101	9	25	57	24	-118	33
9.25	23	87	325	35	-729	99	-45	30	7	20	-175	32
10.25	-3	117	305	52	-790	138	-64	40	-11	28	-200	45
11.25	59	133	323	36	-1001	139	-70	44	-25	27	-254	46

line 2												
*l (mm)**	normal	error	transverse	error	longitudinal	error	normal	error	transverse	error	longitudinal	error
0.25	-489	115	147	170	1044	343	6	61	116	70	272	107
1.25	-454	66	67	54	1181	229	25	37	115	35	307	70
2.25	-559	82	-173	98	1170	216	-40	40	27	42	259	68
3.25	-454	42	-316	61	1256	114	-15	21	8	24	280	36
4.25	-346	54	-553	129	1151	156	-27	31	-63	45	232	51
5.25	-179	42	-767	64	1113	133	-9	23	-111	27	214	41
6.25	-35	26	-951	86	971	40	-8	15	-167	27	166	17
7.25	35	55	-936	51	974	115	15	23	-153	23	178	36
8.25	32	111	-691	101	981	76	48	37	-78	35	212	30
9.25	-179	96	-20	83	944	100	66	34	93	31	260	35
10.25	-398	111	936	74	1025	59	134	36	365	28	380	25
11.25	-656	140	1727	70	931	103	146	45	559	31	421	37

**l* is the distance from front surface

line 3

*l (mm)**	normal	error	transverse	error	longitudinal	error	normal	error	transverse	error	longitudinal	error
0.25	-875	64	-261	80	2299	51	0	23	106	26	549	20
1.25	-1051	34	62	47	2264	134	-16	21	176	23	557	41
2.25	-1144	88	18	105	2146	164	-66	37	135	40	504	53
3.25	-907	14	-47	82	2207	95	6	17	155	28	545	31
4.25	-901	157	-626	234	2177	141	-72	59	-24	76	461	56
5.25	-656	86	-1403	60	2088	76	-110	29	-239	24	365	27
6.25	-331	50	-1978	5	1829	82	-119	19	-405	13	254	26
7.25	-32	28	-1992	47	1689	57	-49	13	-388	17	249	19
8.25	-9	35	-1216	28	1514	132	36	20	-173	20	300	40
9.25	-296	82	170	42	1283	113	99	29	180	22	372	36
10.25	-629	104	1453	93	1301	123	167	37	527	35	501	42
11.25	-1006	137	2025	118	1116	96	103	46	628	42	470	37

line 4

*l (mm)**	normal	error	transverse	error	longitudinal	error	normal	error	transverse	error	longitudinal	error
0.25	-179	25	-571	45	1779	78	103	14	35	17	441	25
1.25	-472	85	-85	85	2119	101	121	31	188	31	569	34
2.25	-858	123	736	63	2488	205	159	46	435	36	738	65
3.25	-1047	66	484	124	2588	89	82	28	347	40	711	33
4.25	-831	114	-574	102	2474	94	-5	39	40	36	567	35
5.25	-562	41	-1561	74	2083	51	-103	17	-275	24	355	19
6.25	-214	65	-2176	98	1837	121	-109	28	-448	35	246	40
7.25	111	96	-2330	91	1719	79	-46	33	-468	32	233	29
8.25	9	101	-1677	108	1681	108	3	37	-289	38	293	38
9.25	-480	162	50	183	1520	167	58	59	150	63	404	60
10.25	-840	111	1342	101	1468	105	110	38	488	36	510	37
11.25	-1225	162	1733	138	1256	112	17	54	529	49	446	44

line 5

*l (mm)**	normal	error	transverse	error	longitudinal	error	normal	error	transverse	error	longitudinal	error
0.25	-272	98	-357	180	1259	32	35	38	20	56	300	28
1.25	-261	36	-146	135	1458	79	91	23	111	42	389	30
2.25	-618	122	645	117	1735	91	122	42	341	41	529	35
3.25	-901	64	880	53	1862	57	83	22	391	20	561	20
4.25	-822	5	-190	79	1746	19	-47	11	62	24	397	12

5.25	-366	90	-1199	140	1441	115	-79	36	-224	46	233	41
6.25	144	126	-1634	110	1253	79	-6	42	-314	39	186	32
7.25	322	42	-1695	75	1199	56	33	17	-316	24	185	20
8.25	255	87	-1266	119	1132	83	60	32	-203	39	212	32
9.25	-167	112	-199	62	1216	95	81	37	76	27	321	33
10.25	-653	127	874	80	1256	97	79	42	343	32	409	35
11.25	-1030	140	1615	88	960	148	22	48	480	38	367	50

line 6

*l (mm)**	normal	error	transverse	error	longitudinal	error	normal	error	transverse	error	longitudinal	error
0.25	106	115	-64	33	1391	96	204	37	175	22	427	33
1.25	-229	26	50	64	1324	55	109	14	157	21	378	19
2.25	-480	118	26	107	1264	116	22	41	110	39	324	41
3.25	-650	31	-56	50	1256	18	-41	12	62	16	289	9
4.25	-597	70	-378	38	1154	84	-80	24	-42	18	223	27
5.25	-445	139	-673	41	1025	109	-89	45	-129	26	165	38
6.25	-237	85	-878	53	936	92	-64	29	-175	23	139	31
7.25	-50	42	-852	43	917	39	-7	15	-145	15	161	14
8.25	18	78	-597	91	965	100	53	29	-53	32	217	34
9.25	-231	97	-158	76	885	84	24	33	37	28	217	30
10.25	-545	118	472	93	815	112	2	41	178	35	237	39
11.25	-846	127	1136	54	517	156	-42	44	301	31	194	51

line 7

*l (mm)**	normal	error	transverse	error	longitudinal	error	normal	error	transverse	error	longitudinal	error
0.25	317	358	117	33	-560	91	38	109	4	49	-113	54
1.25	194	239	155	45	-525	103	11	74	4	36	-114	44
2.25	38	94	220	54	-517	83	-27	31	4	23	-123	29
3.25	135	161	211	77	-520	177	1	55	14	39	-113	58
4.25	152	50	240	35	-469	110	16	21	32	19	-91	34
5.25	176	40	255	61	-461	110	27	20	40	24	-84	35
6.25	132	53	255	46	-472	112	12	22	33	21	-93	35
7.25	120	27	305	62	-440	99	19	17	51	23	-78	31
8.25	100	68	255	64	-480	104	1	26	28	25	-99	34
9.25	15	109	217	60	-555	118	-39	37	-4	28	-138	39
10.25	-12	105	188	53	-742	111	-75	36	-41	26	-202	37
11.25	129	118	202	54	-1121	127	-80	40	-68	28	-297	42

Mid-thickness line (*d* is the distance from the reference line)

	Strains (microstrain)						Stresses (MPa)					
d (mm)	nornal	error	transverse	error	longitudinal	error	normal	error	transverse	error	longitudinal	error
-64	159	28	-74	67	160	112	59	19	19	25	60	35
-60	219	80	-44	55	286	127	98	30	52	26	109	40
-56	337	47	79	55	268	105	147	21	102	22	135	33
-52	436	85	214	51	11	108	161	30	123	24	88	35
-48	520	103	302	95	-376	117	148	37	110	35	-7	40
-44	544	63	413	71	-734	107	123	25	100	27	-98	35
-40	517	36	372	60	-928	121	84	21	59	24	-166	38
-36	485	35	369	45	-994	122	66	20	46	22	-190	38
-32	447	80	316	59	-1018	116	44	30	22	26	-209	38
-28	431	34	287	63	-940	136	46	22	21	26	-192	42
-24	422	32	0	42	-720	137	34	21	-39	22	-163	42
-20	348	51	-249	49	-318	115	32	22	-72	22	-84	36
-16	181	100	-466	54	239	127	25	35	-87	27	35	41
-14	137	42	-615	76	538	150	32	25	-99	31	101	47
-12	120	31	-782	39	756	118	33	19	-123	20	143	36
-10	-39	37	-1027	115	1062	117	-7	24	-178	38	183	39
-8	-24	65	-1363	63	1616	110	26	26	-206	25	310	35
-6	111	68	-1559	52	2072	67	100	23	-189	20	440	23
-4	369	89	-1664	102	2150	39	175	31	-177	33	483	21
-2	337	54	-1652	109	2042	113	153	26	-192	37	448	38
0	131	91	-1497	113	1994	100	104	34	-178	39	427	36
2	23	79	-1115	104	1541	104	62	31	-135	36	325	36
4	-18	57	-852	27	1291	92	51	21	-93	16	278	29
6	187	56	-621	52	1038	59	111	20	-29	19	258	20
8	398	44	-463	78	831	87	168	20	19	27	243	29
10	413	47	-217	53	557	89	169	19	60	21	194	29
12	419	63	32	72	187	87	155	24	88	26	115	29
14	416	27	187	78	-154	125	130	21	91	29	32	39
16	401	37	234	30	-389	139	101	21	72	21	-35	42
20	400	65	237	25	-646	104	68	24	40	18	-113	33
24	394	48	278	11	-614	131	76	22	56	18	-99	40
28	368	50	222	94	-585	151	64	28	39	35	-100	48
32	373	63	211	28	-547	109	69	24	41	18	-90	34

36	379	53	231	58	-558	128	72	24	47	25	-90	40
40	363	50	219	50	-526	140	70	25	45	25	-84	43
44	357	37	219	42	-488	100	73	18	49	19	-73	31
48	297	48	120	46	-445	90	48	20	17	19	-81	29
52	159	43	-9	71	-416	100	-7	20	-36	26	-107	32
56	42	11	-156	58	-306	83	-47	14	-81	21	-108	26
60	134	45	-241	96	122	111	25	23	-40	33	23	36
64	269	118	-413	62	466	106	88	39	-30	28	122	36

Table IV. Measured gauge volume size for individual detectors

Detector No.	1	2	3	4	5	6	7
Gauge volume size (mm^2)	1.7x2	1.7x2	1.7x2	1.7x2	1.7x1.9	1.6x1.9	1.6x1.9