



# Full wwPDB X-ray Structure Validation Report ⓘ

Sep 26, 2017 – 07:56 AM EDT

PDB ID : 1QI9  
Title : X-RAY SIRAS STRUCTURE DETERMINATION OF A VANADIUM-DEPENDENT HALOPEROXIDASE FROM ASCOPHYLLUM NODOSUM AT 2.0 Å RESOLUTION  
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Deposited on : unknown  
Resolution : 2.05 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.7.2 (RC1), CSD as538be (2017)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20030345  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20030345

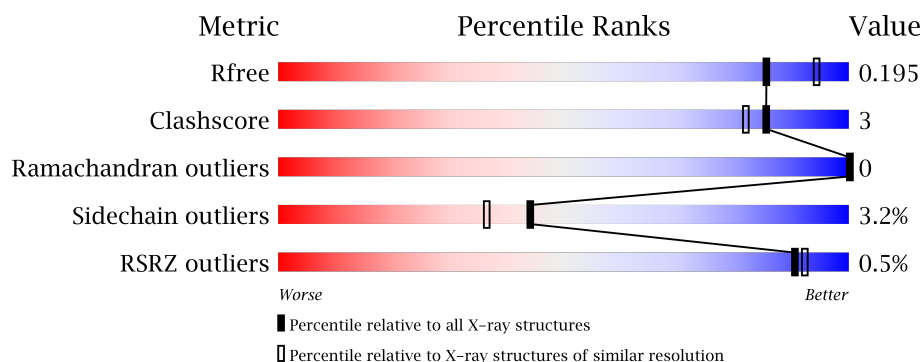
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.05 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	100719	1316 (2.04-2.04)
Clashscore	112137	1394 (2.04-2.04)
Ramachandran outliers	110173	1383 (2.04-2.04)
Sidechain outliers	110143	1383 (2.04-2.04)
RSRZ outliers	101464	1319 (2.04-2.04)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	556	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 1%, orange 1%, yellow 1%, green 89%, grey 10%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>100%</span> <span>89%</span> <span>10%</span> </div> </div>
1	B	556	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, green 89%, yellow 10%, grey 1%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>89%</span> <span>10%</span> </div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	VO4	A	600	-	-	X	-
2	VO4	B	600	-	-	X	-
3	IOD	A	601	-	-	X	-

## 2 Entry composition [i](#)

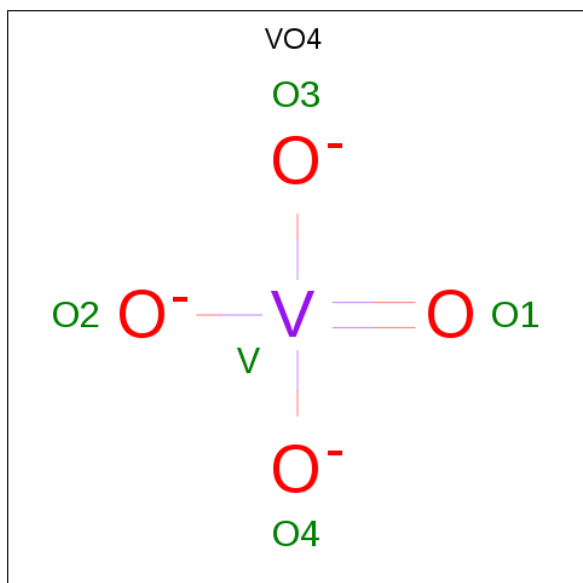
There are 4 unique types of molecules in this entry. The entry contains 10264 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called PROTEIN (VANADIUM BROMOPEROXIDASE).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	555	Total	C	N	O	S	0	0	0
			4241	2682	709	836	14			
1	B	556	Total	C	N	O	S	0	0	0
			4249	2687	710	838	14			

- Molecule 2 is VANADATE ION (three-letter code: VO4) (formula: O<sub>4</sub>V).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	V	0	0
			5	4	1		
2	B	1	Total	O	V	0	0
			5	4	1		

- Molecule 3 is IODIDE ION (three-letter code: IOD) (formula: I).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	2	Total I 2 2	0	0
3	A	3	Total I 3 3	0	0

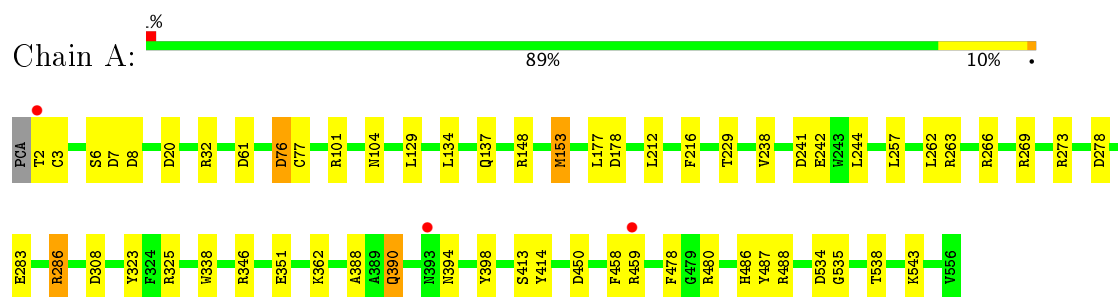
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	877	Total O 877 877	0	0
4	B	882	Total O 882 882	0	0

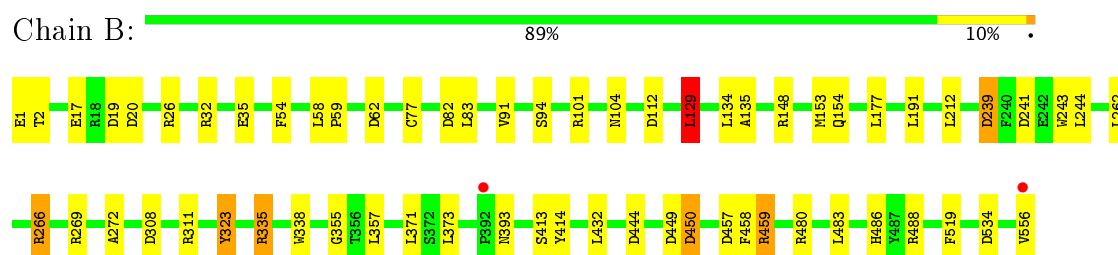
### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: PROTEIN (VANADIUM BROMOPEROXIDASE)



- Molecule 1: PROTEIN (VANADIUM BROMOPEROXIDASE)



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	113.19Å 113.19Å 272.30Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	31.00 – 2.05 31.68 – 2.05	Depositor EDS
% Data completeness (in resolution range)	95.0 (31.00-2.05) 94.7 (31.68-2.05)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.57 (at 2.05Å)	Xtriage
Refinement program	REFMAC	Depositor
R, $R_{free}$	0.165 , 0.219 0.151 , 0.195	Depositor DCC
$R_{free}$ test set	5320 reflections (5.31%)	DCC
Wilson B-factor (Å <sup>2</sup> )	7.0	Xtriage
Anisotropy	0.978	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 75.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.46$ , $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	10264	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	9.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.66% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality ⓘ

### 5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: VO4, IOD, PCA

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.69	0/4336	1.36	35/5912 (0.6%)
1	B	0.70	0/4337	1.37	39/5915 (0.7%)
All	All	0.70	0/8673	1.37	74/11827 (0.6%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	1

There are no bond length outliers.

All (74) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	286	ARG	NE-CZ-NH2	-19.00	110.80	120.30
1	A	414	TYR	CB-CG-CD1	-14.79	112.12	121.00
1	B	148	ARG	NE-CZ-NH2	-12.09	114.26	120.30
1	A	414	TYR	CB-CG-CD2	12.04	128.23	121.00
1	A	76	ASP	CB-CG-OD1	-11.81	107.67	118.30
1	B	32	ARG	NE-CZ-NH1	-11.77	114.41	120.30
1	B	414	TYR	CB-CG-CD1	-10.72	114.57	121.00
1	B	414	TYR	CB-CG-CD2	10.60	127.36	121.00
1	A	286	ARG	NE-CZ-NH1	10.24	125.42	120.30
1	A	269	ARG	NE-CZ-NH1	9.91	125.26	120.30
1	B	2	THR	N-CA-CB	-9.69	91.89	110.30
1	B	335	ARG	NE-CZ-NH1	9.61	125.11	120.30
1	A	323	TYR	CA-CB-CG	9.45	131.36	113.40
1	B	129	LEU	CA-CB-CG	9.39	136.90	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	459	ARG	NE-CZ-NH1	9.30	124.95	120.30
1	B	311	ARG	NE-CZ-NH1	9.10	124.85	120.30
1	B	101	ARG	NE-CZ-NH2	-8.66	115.97	120.30
1	B	269	ARG	NE-CZ-NH1	8.60	124.60	120.30
1	A	478	PHE	CB-CG-CD2	-8.32	114.97	120.80
1	A	398	TYR	CB-CG-CD1	-8.24	116.06	121.00
1	B	323	TYR	CA-CB-CG	8.09	128.77	113.40
1	A	101	ARG	CD-NE-CZ	7.94	134.72	123.60
1	B	148	ARG	NE-CZ-NH1	7.84	124.22	120.30
1	A	390	GLN	CA-CB-CG	7.63	130.18	113.40
1	B	480	ARG	NE-CZ-NH1	7.56	124.08	120.30
1	B	32	ARG	NH1-CZ-NH2	7.50	127.65	119.40
1	B	19	ASP	CB-CG-OD1	7.46	125.02	118.30
1	A	241	ASP	CB-CG-OD1	7.27	124.84	118.30
1	A	478	PHE	CB-CG-CD1	7.11	125.78	120.80
1	A	325	ARG	NE-CZ-NH2	-7.09	116.75	120.30
1	A	459	ARG	NE-CZ-NH2	-7.04	116.78	120.30
1	A	450	ASP	CB-CG-OD1	7.01	124.61	118.30
1	B	444	ASP	CB-CG-OD1	6.99	124.59	118.30
1	B	449	ASP	CB-CG-OD1	6.87	124.48	118.30
1	B	2	THR	CA-CB-CG2	6.74	121.84	112.40
1	B	459	ARG	CD-NE-CZ	6.59	132.83	123.60
1	B	112	ASP	CB-CG-OD1	6.43	124.09	118.30
1	B	459	ARG	NE-CZ-NH2	-6.27	117.16	120.30
1	A	101	ARG	NE-CZ-NH1	6.27	123.44	120.30
1	B	239	ASP	CB-CG-OD1	6.25	123.93	118.30
1	B	457	ASP	CB-CG-OD1	6.03	123.73	118.30
1	A	534	ASP	CB-CG-OD1	6.00	123.70	118.30
1	B	26	ARG	NE-CZ-NH2	-5.97	117.31	120.30
1	A	61	ASP	CB-CG-OD1	5.97	123.67	118.30
1	B	266	ARG	CD-NE-CZ	5.96	131.94	123.60
1	A	8	ASP	CB-CG-OD2	5.94	123.64	118.30
1	A	153	MET	CG-SD-CE	5.83	109.53	100.20
1	A	20	ASP	CB-CG-OD1	5.83	123.55	118.30
1	A	76	ASP	OD1-CG-OD2	5.76	134.25	123.30
1	B	335	ARG	NH1-CZ-NH2	-5.66	113.17	119.40
1	A	351	GLU	OE1-CD-OE2	-5.65	116.52	123.30
1	B	54	PHE	CB-CG-CD2	-5.54	116.92	120.80
1	B	450	ASP	CB-CG-OD1	5.54	123.28	118.30
1	A	286	ARG	CB-CG-CD	-5.52	97.24	111.60
1	A	398	TYR	CB-CG-CD2	5.49	124.30	121.00
1	A	487	TYR	CA-CB-CG	5.45	123.76	113.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	263	ARG	NE-CZ-NH1	5.45	123.03	120.30
1	A	308	ASP	CB-CG-OD2	-5.43	113.41	118.30
1	A	323	TYR	N-CA-CB	-5.43	100.82	110.60
1	B	17	GLU	OE1-CD-OE2	-5.33	116.90	123.30
1	B	83	LEU	CA-CB-CG	5.33	127.56	115.30
1	B	519	PHE	N-CA-CB	5.32	120.18	110.60
1	B	82	ASP	CB-CG-OD1	5.29	123.06	118.30
1	A	7	ASP	CB-CG-OD1	5.18	122.97	118.30
1	B	20	ASP	CB-CG-OD1	5.18	122.97	118.30
1	B	308	ASP	CB-CG-OD1	5.18	122.96	118.30
1	A	480	ARG	NE-CZ-NH2	5.12	122.86	120.30
1	B	444	ASP	CB-CG-OD2	-5.10	113.71	118.30
1	A	242	GLU	OE1-CD-OE2	-5.10	117.18	123.30
1	B	35	GLU	OE1-CD-OE2	-5.08	117.21	123.30
1	B	534	ASP	CB-CG-OD1	5.07	122.87	118.30
1	B	241	ASP	CB-CG-OD1	5.04	122.84	118.30
1	A	148	ARG	CD-NE-CZ	5.00	130.61	123.60
1	A	263	ARG	NE-CZ-NH2	-5.00	117.80	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	1	PCA	Mainchain

## 5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4241	0	4073	21	0
1	B	4249	0	4080	17	0
2	A	5	0	0	4	0
2	B	5	0	0	5	0
3	A	3	0	0	4	0
3	B	2	0	0	2	0
4	A	877	0	0	1	0
4	B	882	0	0	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	10264	0	8153	44	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (44) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:362:LYS:NZ	3:A:601:IOD:I	2.86	0.75
1:A:458:PHE:HA	3:A:603:IOD:I	2.63	0.69
1:B:459:ARG:HD3	4:B:1318:HOH:O	1.91	0.69
1:A:153:MET:HG3	3:A:602:IOD:I	2.65	0.67
2:A:600:VO4:O3	2:A:600:VO4:V	1.52	0.66
2:B:600:VO4:O1	2:B:600:VO4:V	1.54	0.63
1:B:134:LEU:HG	1:B:134:LEU:O	1.99	0.62
1:A:216:PHE:CE1	1:A:286:ARG:HD3	2.35	0.62
2:B:600:VO4:O3	2:B:600:VO4:V	1.57	0.61
2:A:600:VO4:V	2:A:600:VO4:O1	1.59	0.58
1:B:153:MET:HG3	3:B:601:IOD:I	2.73	0.58
1:B:129:LEU:HA	1:B:134:LEU:HD22	1.84	0.58
1:B:58:LEU:HB3	1:B:59:PRO:CD	2.34	0.57
1:B:62:ASP:HB2	4:B:1458:HOH:O	2.05	0.56
1:A:278:ASP:OD2	1:A:283:GLU:OE2	2.25	0.54
1:A:134:LEU:O	1:A:134:LEU:HG	2.07	0.54
1:A:362:LYS:HG2	3:A:601:IOD:I	2.79	0.53
1:A:2:THR:HA	4:A:1269:HOH:O	2.08	0.53
1:B:243:TRP:CZ2	1:B:355:GLY:HA3	2.44	0.52
1:B:486:HIS:NE2	2:B:600:VO4:O1	2.42	0.52
1:A:3:CYS:HB2	1:A:6:SER:O	2.11	0.51
1:A:538:THR:HG22	1:A:543:LYS:HA	1.93	0.50
1:A:177:LEU:HB3	1:A:488:ARG:HD2	1.93	0.50
1:A:346:ARG:HG3	1:A:346:ARG:HH11	1.76	0.50
2:A:600:VO4:O3	2:A:600:VO4:O4	2.30	0.49
1:B:154:GLN:HG2	4:B:1388:HOH:O	2.12	0.49
1:A:129:LEU:C	1:A:129:LEU:HD23	2.34	0.48
1:A:486:HIS:NE2	2:A:600:VO4:O3	2.47	0.48
1:A:238:VAL:HG21	1:A:390:GLN:HG2	1.96	0.48
1:B:458:PHE:HA	3:B:602:IOD:I	2.85	0.47
1:A:229:THR:HA	1:A:273:ARG:HG2	1.97	0.46
1:B:486:HIS:NE2	2:B:600:VO4:O3	2.49	0.45
1:A:137:GLN:HG2	1:A:177:LEU:HD22	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:388:ALA:O	1:A:394:ASN:HA	2.18	0.44
1:B:323:TYR:HA	1:B:432:LEU:HD13	2.01	0.42
1:A:32:ARG:NH2	1:A:535:GLY:HA3	2.34	0.42
1:A:346:ARG:NH1	1:A:346:ARG:HG3	2.34	0.42
1:B:135:ALA:HB1	1:B:373:LEU:HB2	2.02	0.42
1:B:272:ALA:HB1	1:B:483:LEU:HD23	2.03	0.41
1:B:154:GLN:NE2	1:B:450:ASP:OD2	2.47	0.41
2:B:600:VO4:O3	2:B:600:VO4:O4	2.38	0.41
1:A:238:VAL:CG2	1:A:390:GLN:HG2	2.51	0.41
1:B:58:LEU:HB3	1:B:59:PRO:HD2	2.02	0.41
1:B:177:LEU:HB3	1:B:488:ARG:HD2	2.02	0.41

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	553/556 (100%)	538 (97%)	15 (3%)	0	100	100
1	B	554/556 (100%)	541 (98%)	13 (2%)	0	100	100
All	All	1107/1112 (100%)	1079 (98%)	28 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	451/451 (100%)	440 (98%)	11 (2%)	54	48
1	B	451/451 (100%)	433 (96%)	18 (4%)	36	27
All	All	902/902 (100%)	873 (97%)	29 (3%)	44	36

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	76	ASP
1	A	77	CYS
1	A	104	ASN
1	A	178	ASP
1	A	212	LEU
1	A	244	LEU
1	A	257	LEU
1	A	262	LEU
1	A	266	ARG
1	A	338	TRP
1	A	413	SER
1	B	77	CYS
1	B	91	VAL
1	B	94	SER
1	B	104	ASN
1	B	129	LEU
1	B	191	LEU
1	B	212	LEU
1	B	239	ASP
1	B	244	LEU
1	B	262	LEU
1	B	266	ARG
1	B	335	ARG
1	B	338	TRP
1	B	357	LEU
1	B	371	LEU
1	B	393	ASN
1	B	413	SER
1	B	556	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	366	ASN

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Mol	Chain	Res	Type
1	A	554	ASN
1	B	366	ASN
1	B	394	ASN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

1 non-standard protein/DNA/RNA residue is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
1	PCA	B	1	1	8,8,9	1.37	1 (12%)	9,10,12	2.03	1 (11%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	PCA	B	1	1	-	0/0/11/13	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	1	PCA	CA-C	2.45	1.53	1.50

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	1	PCA	O-C-CA	-5.36	112.64	125.15

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates

There are no carbohydrates in this entry.

## 5.6 Ligand geometry

Of 7 ligands modelled in this entry, 5 are monoatomic - leaving 2 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
2	VO4	A	600	1	1,4,4	0.60	0	0,6,6	0.00	-
2	VO4	B	600	1	1,4,4	1.37	0	0,6,6	0.00	-

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	VO4	A	600	1	-	0/0/0/0	0/0/0/0
2	VO4	B	600	1	-	0/0/0/0	0/0/0/0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	600	VO4	4	0
2	B	600	VO4	5	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.



## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2		OWAB(Å <sup>2</sup> )	Q<0.9
1	A	555/556 (99%)	-0.73	3 (0%)	90 92	2, 6, 16, 38	0
1	B	555/556 (99%)	-0.77	2 (0%)	92 93	2, 6, 14, 36	0
All	All	1110/1112 (99%)	-0.75	5 (0%)	90 92	2, 6, 15, 38	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	2	THR	3.4
1	B	392	PRO	2.7
1	A	393	ASN	2.6
1	A	459	ARG	2.6
1	B	556	VAL	2.3

### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
1	PCA	B	1	8/9	0.98	0.08	-	5,7,8,10	0

### 6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
3	IOD	B	601	1/1	0.97	0.07	-0.61	18,18,18,18	1
3	IOD	A	602	1/1	0.98	0.06	-1.45	18,18,18,18	1
2	VO4	A	600	5/5	0.99	0.05	-1.69	2,2,3,3	0
2	VO4	B	600	5/5	0.99	0.06	-1.95	2,2,5,6	0
3	IOD	A	601	1/1	0.97	0.08	-	11,11,11,11	1
3	IOD	B	602	1/1	0.96	0.14	-	21,21,21,21	1
3	IOD	A	603	1/1	0.92	0.17	-	24,24,24,24	1

## 6.5 Other polymers [i](#)

There are no such residues in this entry.