



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 2, 2024 – 08:00 AM EST

PDB ID : 5ENL  
Title : INHIBITION OF ENOLASE: THE CRYSTAL STRUCTURES OF ENOLASE-CA<sup>2+</sup>-PHOSPHOGLYCERATE AND ENOLASE-ZN<sup>2+</sup>-PHOSPHOGLYCERATE COMPLEXES AT 2.2-ANGSTROMS RESOLUTION  
Authors : Lebioda, L.; Stec, B.  
Deposited on : 1990-11-13  
Resolution : 2.20 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

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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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 : 1.8.5 (274361), CSD as541be (2020)  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

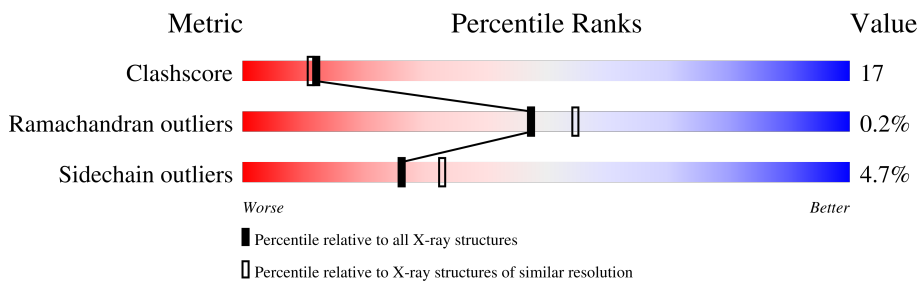
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.20 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))
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)

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 of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. 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  $\leq 5\%$ .

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	436	 64% 31% 5%

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 3656 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 ENOLASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	436	3289	2076	569	638	6	0	0	0

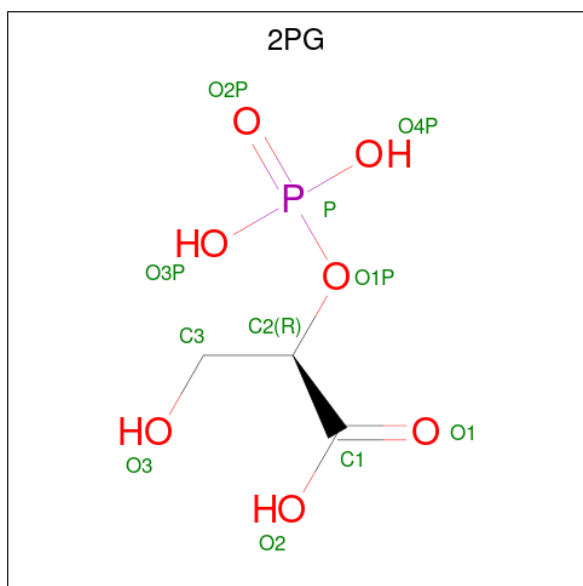
There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	84	SER	LYS	conflict	UNP P00924

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Ca	0	0
			1	1		

- Molecule 3 is 2-PHOSPHOGLYCERIC ACID (three-letter code: 2PG) (formula: C<sub>3</sub>H<sub>7</sub>O<sub>7</sub>P).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	O	P	0	0
			11	3	7	1		

- Molecule 4 is water.

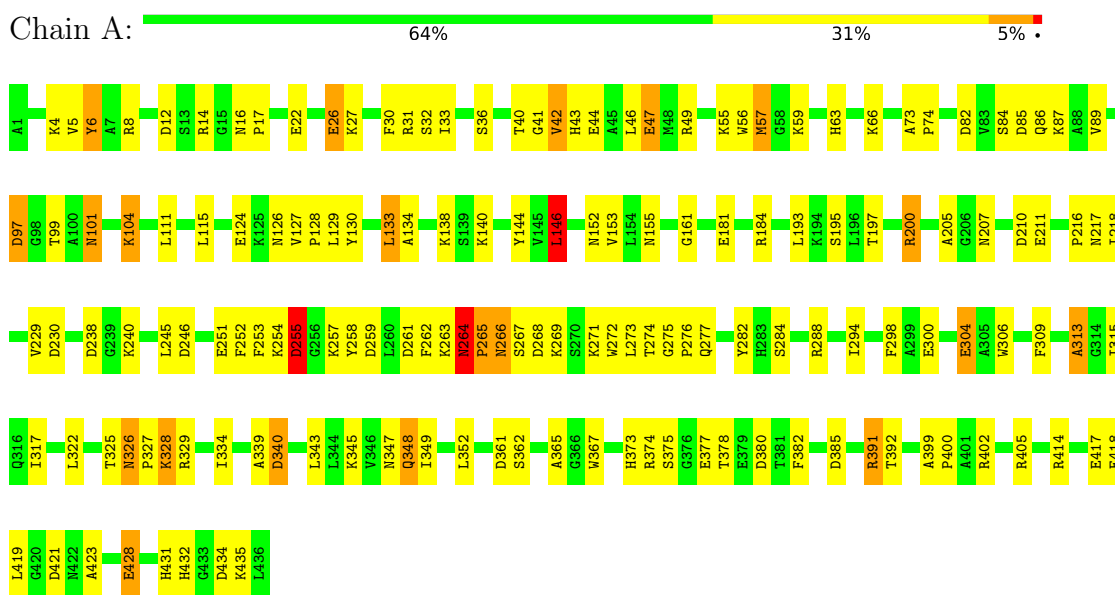
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	355	Total	O	0	0
			355	355		

### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide 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. 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. 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.

Note EDS was not executed.

- Molecule 1: ENOLASE



## 4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 42 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	124.10Å 124.10Å 66.90Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	(Not available) – 2.20	Depositor
% Data completeness (in resolution range)	(Not available) ((Not available)-2.20)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	PROLSQ	Depositor
R, $R_{free}$	0.148 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	3656	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	20.0	wwPDB-VP

## 5 Model quality i

### 5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: 2PG, CA

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	0.94	1/3349 (0.0%)	1.94	84/4531 (1.9%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	36	SER	CB-OG	5.57	1.49	1.42

All (84) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	8	ARG	NE-CZ-NH1	25.15	132.87	120.30
1	A	8	ARG	NE-CZ-NH2	-18.76	110.92	120.30
1	A	31	ARG	NE-CZ-NH1	17.43	129.01	120.30
1	A	414	ARG	NE-CZ-NH2	-13.63	113.48	120.30
1	A	49	ARG	NE-CZ-NH2	-13.46	113.57	120.30
1	A	414	ARG	NE-CZ-NH1	13.25	126.92	120.30
1	A	14	ARG	NE-CZ-NH2	-12.44	114.08	120.30
1	A	31	ARG	NE-CZ-NH2	-12.08	114.26	120.30
1	A	49	ARG	NE-CZ-NH1	11.31	125.96	120.30
1	A	329	ARG	CD-NE-CZ	10.59	138.42	123.60
1	A	251	GLU	OE1-CD-OE2	10.21	135.55	123.30
1	A	47	GLU	OE1-CD-OE2	9.88	135.15	123.30
1	A	246	ASP	CB-CG-OD1	9.65	126.99	118.30
1	A	405	ARG	NE-CZ-NH1	9.54	125.07	120.30
1	A	361	ASP	CB-CG-OD2	-9.34	109.89	118.30
1	A	421	ASP	CB-CG-OD1	9.33	126.70	118.30
1	A	184	ARG	NE-CZ-NH2	9.12	124.86	120.30
1	A	85	ASP	CB-CG-OD1	9.07	126.47	118.30
1	A	6	TYR	CB-CG-CD2	8.82	126.30	121.00
1	A	282	TYR	CB-CG-CD2	-8.72	115.77	121.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	340	ASP	CB-CG-OD1	8.59	126.03	118.30
1	A	6	TYR	CB-CG-CD1	-8.36	115.98	121.00
1	A	140	LYS	CA-CB-CG	8.30	131.67	113.40
1	A	184	ARG	CD-NE-CZ	8.27	135.18	123.60
1	A	263	LYS	C-N-CA	7.66	140.84	121.70
1	A	200	ARG	NE-CZ-NH2	-7.60	116.50	120.30
1	A	258	TYR	CB-CG-CD2	-7.43	116.54	121.00
1	A	251	GLU	CG-CD-OE1	-7.30	103.69	118.30
1	A	414	ARG	CD-NE-CZ	-7.28	113.40	123.60
1	A	380	ASP	CB-CG-OD1	7.15	124.73	118.30
1	A	85	ASP	CB-CG-OD2	-6.91	112.08	118.30
1	A	417	GLU	OE1-CD-OE2	6.89	131.56	123.30
1	A	36	SER	CB-CA-C	6.83	123.07	110.10
1	A	246	ASP	N-CA-CB	6.79	122.83	110.60
1	A	282	TYR	CB-CG-CD1	6.64	124.98	121.00
1	A	255	ASP	CA-C-O	-6.62	106.21	120.10
1	A	391	ARG	CD-NE-CZ	-6.53	114.46	123.60
1	A	49	ARG	CD-NE-CZ	6.42	132.59	123.60
1	A	264	ASN	CA-CB-CG	-6.41	99.29	113.40
1	A	348	GLN	N-CA-CB	6.30	121.95	110.60
1	A	97	ASP	CB-CG-OD2	-6.26	112.66	118.30
1	A	84	SER	N-CA-CB	6.14	119.71	110.50
1	A	82	ASP	CB-CG-OD1	6.10	123.79	118.30
1	A	8	ARG	CD-NE-CZ	6.02	132.03	123.60
1	A	434	ASP	CB-CG-OD2	6.02	123.72	118.30
1	A	402	ARG	NE-CZ-NH1	6.01	123.31	120.30
1	A	230	ASP	CB-CG-OD2	6.00	123.70	118.30
1	A	161	GLY	N-CA-C	-5.93	98.27	113.10
1	A	210	ASP	CB-CG-OD2	5.93	123.64	118.30
1	A	309	PHE	O-C-N	5.85	132.07	122.70
1	A	284	SER	N-CA-CB	-5.85	101.73	110.50
1	A	245	LEU	O-C-N	5.79	131.96	122.70
1	A	181	GLU	OE1-CD-OE2	-5.77	116.38	123.30
1	A	12	ASP	CB-CG-OD1	5.77	123.49	118.30
1	A	30	PHE	CB-CG-CD1	-5.76	116.77	120.80
1	A	246	ASP	CB-CG-OD2	-5.75	113.12	118.30
1	A	12	ASP	CB-CG-OD2	5.70	123.43	118.30
1	A	352	LEU	CB-CA-C	5.63	120.90	110.20
1	A	238	ASP	CB-CG-OD1	5.49	123.24	118.30
1	A	42	VAL	N-CA-C	-5.48	96.19	111.00
1	A	264	ASN	N-CA-C	5.48	125.79	111.00
1	A	313	ALA	CB-CA-C	5.46	118.30	110.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	229	VAL	CB-CA-C	5.44	121.73	111.40
1	A	245	LEU	CA-CB-CG	5.42	127.77	115.30
1	A	12	ASP	OD1-CG-OD2	-5.41	113.02	123.30
1	A	255	ASP	O-C-N	5.41	132.39	123.20
1	A	26	GLU	CB-CA-C	-5.40	99.61	110.40
1	A	87	LYS	N-CA-CB	5.37	120.26	110.60
1	A	211	GLU	OE1-CD-OE2	5.37	129.74	123.30
1	A	385	ASP	CB-CG-OD1	-5.33	113.51	118.30
1	A	14	ARG	NH1-CZ-NH2	5.31	125.24	119.40
1	A	134	ALA	CB-CA-C	5.29	118.03	110.10
1	A	304	GLU	OE1-CD-OE2	5.27	129.62	123.30
1	A	195	SER	CB-CA-C	-5.25	100.12	110.10
1	A	146	LEU	CB-CA-C	5.24	120.16	110.20
1	A	288	ARG	NE-CZ-NH1	5.20	122.90	120.30
1	A	59	LYS	CA-CB-CG	-5.13	102.11	113.40
1	A	428	GLU	CB-CA-C	-5.12	100.16	110.40
1	A	32	SER	N-CA-CB	5.11	118.16	110.50
1	A	253	PHE	O-C-N	5.06	130.80	122.70
1	A	22	GLU	OE1-CD-OE2	5.04	129.35	123.30
1	A	59	LYS	O-C-N	5.03	131.75	123.20
1	A	217	ASN	CB-CA-C	5.03	120.45	110.40
1	A	30	PHE	CA-CB-CG	-5.01	101.87	113.90

There are no chirality outliers.

There are no planarity outliers.

## 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	3289	0	3293	112	1
2	A	1	0	0	0	0
3	A	11	0	4	2	0
4	A	355	0	0	27	3
All	All	3656	0	3297	113	3

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 17.

All (113) 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:435:LYS:HE3	4:A:698:HOH:O	1.40	1.21
1:A:264:ASN:HD22	1:A:267:SER:HA	1.21	1.02
1:A:264:ASN:ND2	1:A:267:SER:HA	1.79	0.96
1:A:200:ARG:HB3	4:A:770:HOH:O	1.70	0.91
1:A:432:HIS:HD2	4:A:675:HOH:O	1.53	0.91
1:A:63:HIS:HD2	1:A:66:LYS:NZ	1.69	0.89
1:A:326:ASN:HD21	1:A:328:LYS:HG3	1.41	0.85
1:A:313:ALA:CB	1:A:317:ILE:HD11	2.08	0.84
1:A:57:MET:SD	4:A:696:HOH:O	2.37	0.83
1:A:138:LYS:HE3	4:A:775:HOH:O	1.83	0.78
1:A:63:HIS:CD2	1:A:66:LYS:NZ	2.51	0.77
1:A:41:GLY:CA	1:A:46:LEU:HD21	2.16	0.76
1:A:432:HIS:CD2	4:A:675:HOH:O	2.32	0.76
1:A:42:VAL:O	4:A:731:HOH:O	2.04	0.75
1:A:326:ASN:C	1:A:326:ASN:HD22	1.91	0.73
1:A:255:ASP:HB3	4:A:712:HOH:O	1.92	0.69
1:A:268:ASP:OD2	1:A:271:LYS:HE2	1.92	0.69
1:A:63:HIS:HD2	1:A:66:LYS:HZ2	1.41	0.68
1:A:63:HIS:HD2	1:A:66:LYS:HZ3	1.39	0.67
1:A:4:LYS:HE2	1:A:6:TYR:HB2	1.77	0.66
1:A:41:GLY:HA3	1:A:46:LEU:HD21	1.78	0.66
1:A:152:ASN:HB2	4:A:758:HOH:O	1.96	0.66
1:A:326:ASN:ND2	1:A:328:LYS:HG3	2.10	0.65
1:A:41:GLY:O	4:A:650:HOH:O	2.12	0.65
1:A:257:LYS:HE3	4:A:618:HOH:O	1.95	0.65
1:A:240:LYS:NZ	4:A:783:HOH:O	2.30	0.64
1:A:138:LYS:HE3	4:A:776:HOH:O	1.96	0.64
1:A:264:ASN:HB2	1:A:267:SER:HB2	1.80	0.64
1:A:313:ALA:HB1	1:A:317:ILE:HD11	1.79	0.63
1:A:428:GLU:OE1	4:A:629:HOH:O	2.15	0.63
1:A:73:ALA:HB3	1:A:74:PRO:HD3	1.79	0.63
1:A:63:HIS:CD2	1:A:66:LYS:HZ2	2.13	0.62
1:A:313:ALA:HB3	1:A:317:ILE:HD11	1.81	0.61
1:A:146:LEU:CD1	1:A:423:ALA:HB1	2.31	0.61
1:A:99:THR:HB	4:A:732:HOH:O	2.00	0.60
1:A:261:ASP:OD2	1:A:264:ASN:ND2	2.34	0.60
3:A:442:2PG:O3	4:A:514:HOH:O	1.99	0.60
1:A:273:LEU:HD22	1:A:277:GLN:HB2	1.83	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:41:GLY:N	1:A:46:LEU:HD21	2.16	0.59
1:A:4:LYS:HD2	4:A:768:HOH:O	2.02	0.59
1:A:298:PHE:HB2	1:A:306:TRP:CD1	2.38	0.58
1:A:264:ASN:OD1	1:A:264:ASN:C	2.41	0.57
1:A:44:GLU:N	4:A:521:HOH:O	2.38	0.57
1:A:273:LEU:HD22	1:A:277:GLN:CB	2.35	0.56
1:A:268:ASP:OD2	1:A:271:LYS:CE	2.54	0.56
1:A:264:ASN:OD1	1:A:264:ASN:O	2.24	0.56
1:A:152:ASN:HD21	1:A:155:ASN:ND2	2.05	0.55
1:A:4:LYS:HD3	4:A:471:HOH:O	2.06	0.55
1:A:261:ASP:HA	4:A:578:HOH:O	2.05	0.55
1:A:264:ASN:ND2	1:A:267:SER:CA	2.64	0.55
1:A:129:LEU:HG	1:A:133:LEU:HD22	1.89	0.54
1:A:399:ALA:HB1	1:A:400:PRO:HD2	1.90	0.54
1:A:264:ASN:HB3	1:A:265:PRO:CA	2.39	0.53
1:A:273:LEU:CD2	1:A:277:GLN:HB2	2.39	0.53
1:A:257:LYS:HG3	4:A:618:HOH:O	2.09	0.53
1:A:264:ASN:HB3	1:A:266:ASN:N	2.24	0.52
1:A:294:ILE:HG13	1:A:315:ILE:HD11	1.92	0.52
1:A:326:ASN:C	1:A:326:ASN:ND2	2.61	0.52
1:A:66:LYS:HD3	4:A:689:HOH:O	2.08	0.52
1:A:41:GLY:N	1:A:46:LEU:CD2	2.73	0.51
1:A:153:VAL:HB	1:A:193:LEU:HD23	1.92	0.51
1:A:340:ASP:O	1:A:431:HIS:HE1	1.94	0.51
1:A:275:GLY:N	1:A:276:PRO:CD	2.74	0.50
1:A:63:HIS:CD2	1:A:66:LYS:HZ3	2.24	0.50
1:A:33:ILE:HG22	1:A:378:THR:HG21	1.94	0.49
1:A:42:VAL:HG22	1:A:43:HIS:CE1	2.47	0.49
1:A:327:PRO:HG3	4:A:652:HOH:O	2.12	0.49
1:A:317:ILE:O	1:A:339:ALA:HB1	2.13	0.49
1:A:343:LEU:HD23	1:A:345:LYS:HE3	1.94	0.49
1:A:66:LYS:HE2	4:A:505:HOH:O	2.12	0.48
1:A:268:ASP:HB3	1:A:271:LYS:CD	2.43	0.48
1:A:43:HIS:C	4:A:521:HOH:O	2.51	0.48
1:A:111:LEU:HD22	1:A:347:ASN:HA	1.95	0.48
1:A:375:SER:HB2	3:A:442:2PG:O3P	2.13	0.48
1:A:115:LEU:HD22	1:A:382:PHE:CZ	2.49	0.47
1:A:254:LYS:O	1:A:255:ASP:HB2	2.13	0.47
1:A:130:TYR:OH	1:A:418:GLU:OE2	2.14	0.47
1:A:216:PRO:HG2	1:A:218:ILE:CD1	2.45	0.47
1:A:153:VAL:HB	1:A:193:LEU:CD2	2.44	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:146:LEU:HD13	1:A:423:ALA:HB1	1.96	0.47
1:A:97:ASP:OD1	1:A:104:LYS:HB3	2.15	0.46
1:A:269:LYS:HG3	1:A:272:TRP:CD2	2.50	0.46
1:A:264:ASN:HD22	1:A:267:SER:CA	2.10	0.46
1:A:27:LYS:HD2	1:A:124:GLU:HA	1.98	0.45
1:A:66:LYS:HG3	4:A:574:HOH:O	2.17	0.45
1:A:86:GLN:O	1:A:89:VAL:HB	2.17	0.45
1:A:362:SER:O	1:A:367:TRP:HB2	2.17	0.45
1:A:345:LYS:HB2	1:A:348:GLN:HG3	1.98	0.45
1:A:274:THR:OG1	1:A:277:GLN:HG3	2.16	0.45
1:A:55:LYS:HE3	4:A:695:HOH:O	2.16	0.44
1:A:252:PHE:HB3	1:A:262:PHE:CD1	2.52	0.44
1:A:273:LEU:CD2	1:A:277:GLN:CB	2.94	0.44
1:A:26:GLU:HG2	1:A:27:LYS:HG3	2.00	0.44
1:A:334:ILE:HD13	1:A:365:ALA:HB2	2.00	0.44
1:A:152:ASN:O	1:A:399:ALA:HB2	2.18	0.43
1:A:343:LEU:HD12	1:A:343:LEU:HA	1.93	0.43
1:A:261:ASP:O	1:A:264:ASN:HB2	2.19	0.43
1:A:325:THR:O	1:A:349:ILE:HD12	2.19	0.43
1:A:73:ALA:HB3	1:A:74:PRO:CD	2.48	0.43
1:A:300:GLU:O	1:A:322:LEU:HD12	2.19	0.43
1:A:4:LYS:HG2	1:A:5:VAL:N	2.34	0.43
1:A:197:THR:HG22	1:A:205:ALA:HB1	2.01	0.43
1:A:104:LYS:C	1:A:104:LYS:HD3	2.39	0.42
1:A:391:ARG:HH11	1:A:391:ARG:HD3	1.55	0.42
1:A:326:ASN:HA	1:A:327:PRO:HD3	1.86	0.42
1:A:101:ASN:ND2	1:A:101:ASN:H	2.17	0.41
1:A:216:PRO:HG2	1:A:218:ILE:HD12	2.00	0.41
1:A:56:TRP:C	1:A:57:MET:HG2	2.40	0.41
1:A:16:ASN:HA	1:A:17:PRO:HD3	1.89	0.41
1:A:254:LYS:NZ	1:A:259:ASP:OD2	2.50	0.41
1:A:374:ARG:O	1:A:377:GLU:HG2	2.20	0.41
1:A:144:TYR:HB2	1:A:419:LEU:HD13	2.03	0.40
1:A:127:VAL:HB	1:A:128:PRO:CD	2.52	0.40

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:730:HOH:O	4:A:730:HOH:O[8_666]	1.65	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:709:HOH:O	4:A:768:HOH:O[5_655]	1.80	0.40
1:A:207:ASN:ND2	4:A:761:HOH:O[8_666]	2.18	0.02

## 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	434/436 (100%)	418 (96%)	15 (4%)	1 (0%)	47 55

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	264	ASN

### 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	344/344 (100%)	328 (95%)	16 (5%)	26 33

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	40	THR
1	A	47	GLU
1	A	57	MET

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Mol	Chain	Res	Type
1	A	101	ASN
1	A	104	LYS
1	A	126	ASN
1	A	133	LEU
1	A	146	LEU
1	A	255	ASP
1	A	265	PRO
1	A	266	ASN
1	A	304	GLU
1	A	326	ASN
1	A	328	LYS
1	A	373	HIS
1	A	392	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	43	HIS
1	A	63	HIS
1	A	101	ASN
1	A	155	ASN
1	A	217	ASN
1	A	264	ASN
1	A	266	ASN
1	A	326	ASN
1	A	348	GLN
1	A	432	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

There are no non-standard protein/DNA/RNA residues in this entry.

### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry

Of 2 ligands modelled in this entry, 1 is monoatomic - leaving 1 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
3	2PG	A	442	2	9,10,10	1.20	2 (22%)	11,14,14	1.97	3 (27%)

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
3	2PG	A	442	2	-	5/11/11/11	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	442	2PG	O1-C1	2.44	1.29	1.22
3	A	442	2PG	P-O4P	-2.07	1.46	1.54

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	442	2PG	O1-C1-C2	-4.78	111.29	122.57
3	A	442	2PG	O2-C1-C2	2.57	120.36	113.03
3	A	442	2PG	O3-C3-C2	2.32	117.63	111.73

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	442	2PG	O1-C1-C2-O1P
3	A	442	2PG	O2-C1-C2-O1P
3	A	442	2PG	C1-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
3	A	442	2PG	O1P-C2-C3-O3
3	A	442	2PG	C2-O1P-P-O4P

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	442	2PG	2	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

### 6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

### 6.4 Ligands

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers

EDS was not executed - this section is therefore empty.