



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 12:05 AM GMT

PDB ID : 1ZLQ  
Title : Crystallographic and spectroscopic evidence for high affinity binding of Fe EDTA (H<sub>2</sub>O)- to the periplasmic nickel transporter NikA  
Authors : Cherrier, M.V.; Martin, L.; Cavazza, C.; Jacquamet, L.; Lemaire, D.; Gaillard, J.; Fontecilla Camps, J.C.  
Deposited on : 2005-05-09  
Resolution : 1.80 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 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
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) : trunk26865

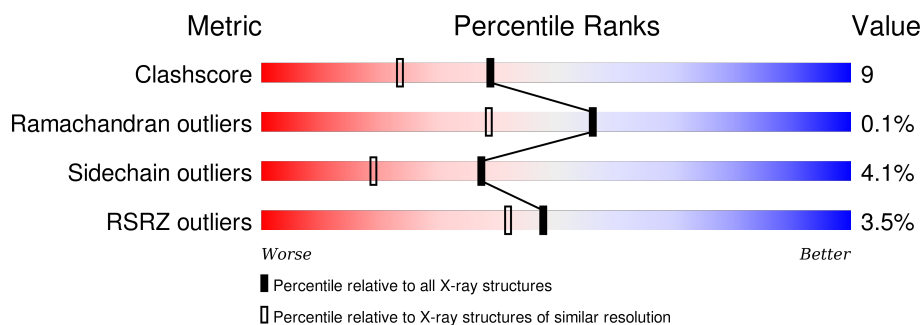
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.80 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	102246	5383 (1.80-1.80)
Ramachandran outliers	100387	5320 (1.80-1.80)
Sidechain outliers	100360	5319 (1.80-1.80)
RSRZ outliers	91569	4547 (1.80-1.80)

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	502	
1	B	502	

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
3	ACT	A	1502	-	-	-	X
3	ACT	A	1505	-	-	-	X

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	ACT	A	1506	-	-	X	X
3	ACT	A	1507	-	-	-	X
3	ACT	B	1504	-	-	-	X
6	EDT	A	1513[A]	-	-	-	X
6	EDT	A	1513[B]	-	-	-	X
6	EDT	B	1511[A]	-	-	-	X
6	EDT	B	1511[B]	-	-	-	X
7	DTT	A	1514[A]	-	-	-	X
7	DTT	A	1514[B]	-	-	-	X
8	GOL	A	1517	-	-	-	X
8	GOL	B	1513	-	-	X	X

## 2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 9116 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.

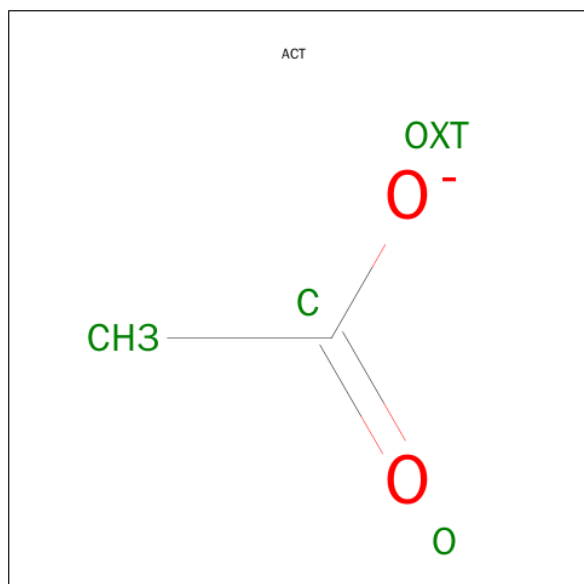
- Molecule 1 is a protein called Nickel-binding periplasmic protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	499	Total	C	N	O	S	8	21	0
			4057	2605	681	758	13			
1	B	499	Total	C	N	O	S	20	22	0
			4063	2609	683	758	13			

- Molecule 2 is FE (III) ION (three-letter code: FE) (formula: Fe).

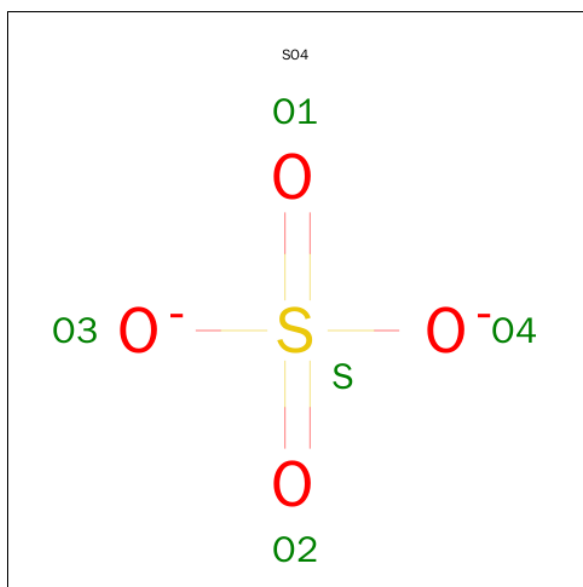
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	1	Total	Fe	0	0
			1	1		
2	A	1	Total	Fe	0	0
			1	1		

- Molecule 3 is ACETATE ION (three-letter code: ACT) (formula: C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).

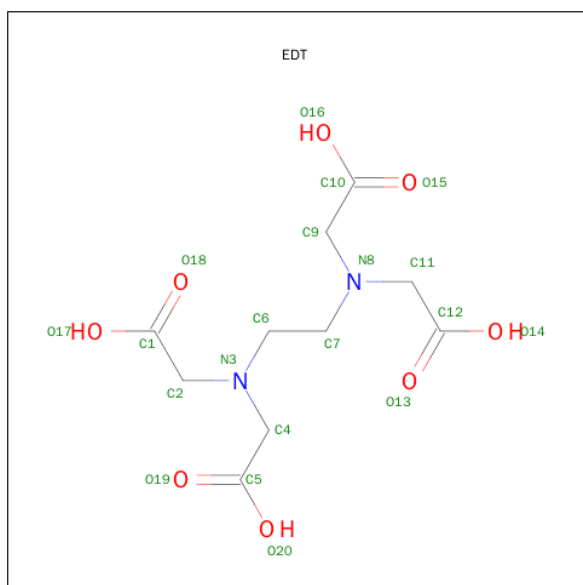


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total O S 5 4 1	0	0

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

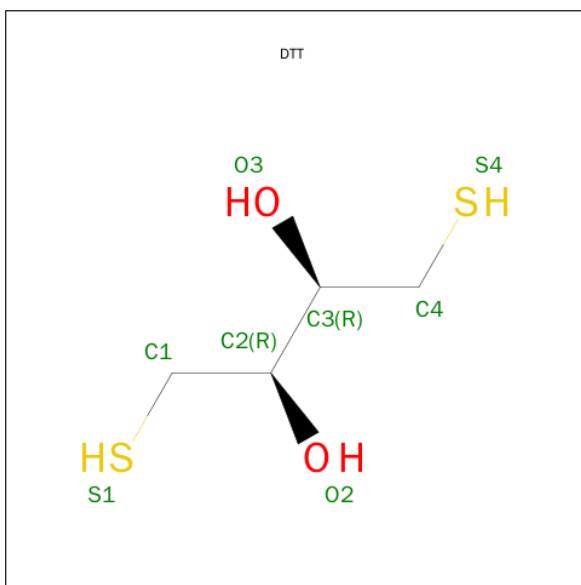
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total Cl 1 1	0	0
5	A	4	Total Cl 4 4	0	0

- Molecule 6 is {[-(BIS-CARBOXYMETHYL-AMINO)-ETHYL]-CARBOXYMETHYL-AMINO}-ACETIC ACID (three-letter code: EDT) (formula: C<sub>10</sub>H<sub>16</sub>N<sub>2</sub>O<sub>8</sub>).



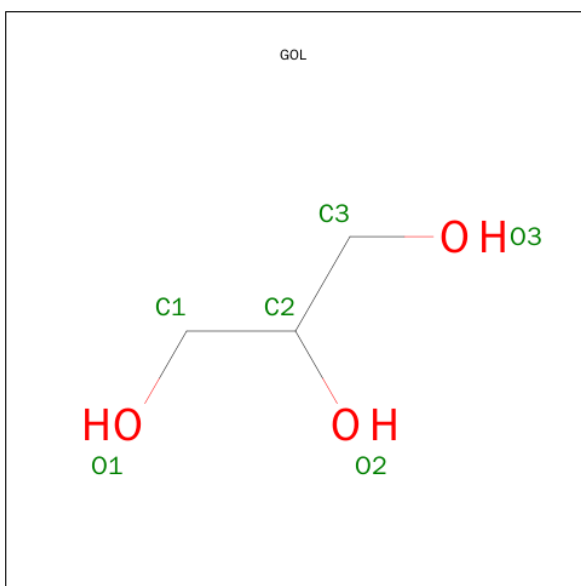
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C N O 24 12 2 10	0	1
6	B	1	Total C N O 26 12 2 12	0	1

- Molecule 7 is 2,3-DIHYDROXY-1,4-DITHIOBUTANE (three-letter code: DTT) (formula: C<sub>4</sub>H<sub>10</sub>O<sub>2</sub>S<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	S	
			9	4	2	3	

- Molecule 8 is GLYCEROL (three-letter code: GOL) (formula:  $C_3H_8O_3$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	C	O		
			6	3	3	0	0
8	B	1	Total	C	O		
			6	3	3	0	0
8	A	1	Total	C	O		
			6	3	3	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	C	O	0	0
			6	3	3		
8	B	1	Total	C	O	0	0
			6	3	3		

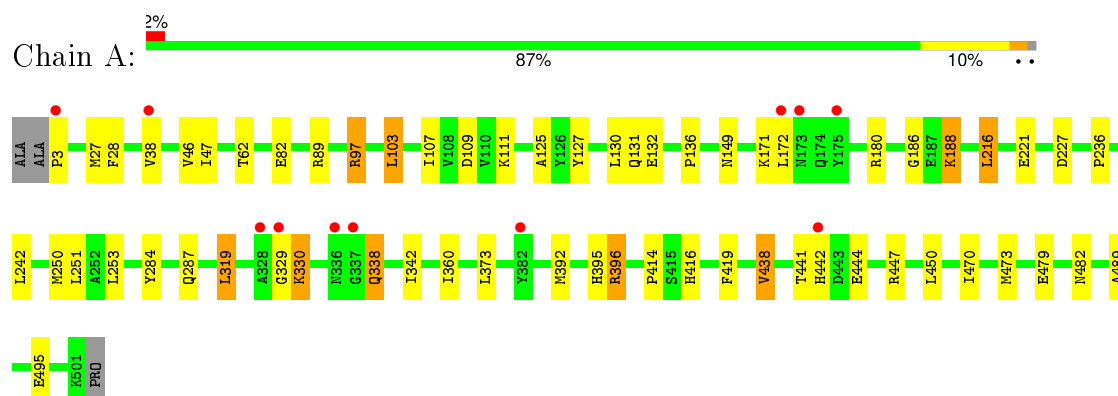
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	480	Total	O	0	0
			480	480		
9	B	379	Total	O	0	0
			379	379		

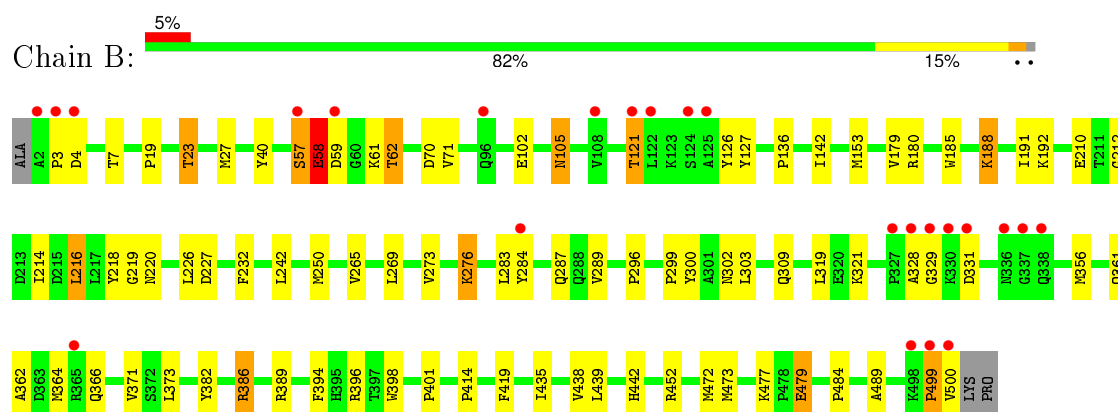
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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 ( $\text{RSRZ} > 2$ ). 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: Nickel-binding periplasmic protein



#### • Molecule 1: Nickel-binding periplasmic protein



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	86.83Å 93.87Å 124.49Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.20 – 1.80 39.19 – 1.80	Depositor EDS
% Data completeness (in resolution range)	100.0 (39.20-1.80) 99.3 (39.19-1.80)	Depositor EDS
$R_{merge}$	0.05	Depositor
$R_{sym}$	0.05	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.13 (at 1.81Å)	Xtriage
Refinement program	REFMAC 5	Depositor
R, $R_{free}$	0.163 , 0.218 0.165 , (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	DCC
Wilson B-factor (Å <sup>2</sup> )	18.3	Xtriage
Anisotropy	0.189	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 58.4	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Outliers	0 of 94047 reflections	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	9116	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	20.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.31% 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, 0.375 respectively for untwinned datasets, and 0.333, 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: GOL, CL, FE, EDT, ACT, DTT, SO4

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	0.66	2/4245 (0.0%)	0.74	5/5775 (0.1%)
1	B	0.63	2/4257 (0.0%)	0.78	7/5796 (0.1%)
All	All	0.64	4/8502 (0.0%)	0.76	12/11571 (0.1%)

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	A	0	1
1	B	0	3
All	All	0	4

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	330	LYS	CG-CD	-9.53	1.20	1.52
1	B	386	ARG	CB-CG	-6.85	1.34	1.52
1	B	58	GLU	CA-C	6.48	1.69	1.52
1	A	330	LYS	CE-NZ	-6.25	1.33	1.49

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	58	GLU	CA-C-O	-20.01	78.07	120.10
1	B	57	SER	O-C-N	-12.69	102.40	122.70
1	A	330	LYS	CB-CG-CD	10.81	139.71	111.60
1	A	338	GLN	CG-CD-OE1	-7.96	105.68	121.60
1	B	396	ARG	NE-CZ-NH1	-7.81	116.40	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	396	ARG	NE-CZ-NH2	6.60	123.60	120.30
1	A	216	LEU	CB-CG-CD2	5.94	121.10	111.00
1	B	57	SER	CA-C-N	5.82	129.99	117.20
1	B	386	ARG	CA-CB-CG	5.62	125.77	113.40
1	A	396	ARG	NE-CZ-NH1	-5.29	117.66	120.30
1	A	319	LEU	CB-CG-CD1	5.26	119.95	111.00
1	B	216	LEU	CA-CB-CG	5.01	126.83	115.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	338	GLN	Sidechain
1	B	57	SER	Mainchain
1	B	58	GLU	Mainchain
1	B	70	ASP	Peptide

## 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	4057	0	4014	46	0
1	B	4063	0	4008	95	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	24	0	18	5	0
3	B	12	0	9	2	0
4	A	5	0	0	0	0
5	A	4	0	0	0	0
5	B	1	0	0	0	0
6	A	24	0	4	1	0
6	B	26	0	8	0	0
7	A	9	0	6	0	0
8	A	18	0	24	2	0
8	B	12	0	16	29	0
9	A	480	0	0	11	0
9	B	379	0	0	15	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	9116	0	8107	145	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 9.

All (145) 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:B:59[A]:ASP:HB3	8:B:1513:GOL:O1	1.20	1.31
1:B:220[B]:ASN:OD1	1:B:472[B]:MET:CE	1.81	1.28
1:B:59[B]:ASP:CG	8:B:1513:GOL:H11	1.54	1.27
1:B:59[B]:ASP:HB2	8:B:1513:GOL:O1	1.30	1.26
1:B:59[B]:ASP:CB	8:B:1513:GOL:C1	2.22	1.18
1:B:59[A]:ASP:CB	8:B:1513:GOL:C1	2.23	1.16
1:B:59[B]:ASP:OD1	8:B:1513:GOL:H11	0.94	1.10
1:B:59[B]:ASP:CG	8:B:1513:GOL:C1	2.17	1.09
1:B:220[B]:ASN:OD1	1:B:472[B]:MET:HE2	1.57	1.05
1:B:59[A]:ASP:CG	8:B:1513:GOL:C1	2.26	1.04
1:A:149:ASN:H	8:A:1516:GOL:H11	1.23	1.04
1:B:220[B]:ASN:OD1	1:B:472[B]:MET:HE1	1.55	1.02
1:B:59[A]:ASP:CG	8:B:1513:GOL:H12	1.79	1.02
1:B:287:GLN:HE22	1:B:473[A]:MET:CE	1.75	1.00
1:B:287:GLN:HE22	1:B:473[A]:MET:HE2	1.26	0.99
1:B:59[B]:ASP:HB2	8:B:1513:GOL:HO1	0.92	0.97
1:B:220[B]:ASN:ND2	9:B:1626:HOH:O	1.96	0.97
1:B:59[A]:ASP:CB	8:B:1513:GOL:H11	2.01	0.91
1:B:59[B]:ASP:OD1	8:B:1513:GOL:H31	1.71	0.88
1:A:38[A]:VAL:HG12	1:A:46:VAL:HB	1.53	0.88
1:B:59[A]:ASP:OD2	8:B:1513:GOL:C1	2.22	0.88
1:B:23[A]:THR:HG23	3:B:1504:ACT:O	1.72	0.87
1:A:287:GLN:HG3	9:A:1990:HOH:O	1.74	0.86
1:B:59[A]:ASP:OD2	8:B:1513:GOL:H12	1.74	0.85
1:B:59[A]:ASP:HB2	8:B:1513:GOL:H11	1.60	0.83
1:B:59[A]:ASP:HB3	8:B:1513:GOL:HO1	1.01	0.83
1:B:59[A]:ASP:HB3	8:B:1513:GOL:C1	1.99	0.82
1:B:191[A]:ILE:HD11	1:B:499:PRO:HG3	1.60	0.81
1:B:361:GLN:HA	1:B:371[A]:VAL:CG2	2.10	0.81
1:B:59[B]:ASP:CG	8:B:1513:GOL:O1	2.16	0.81
1:B:153:MET:HE2	9:B:1885:HOH:O	1.83	0.78
1:A:109:ASP:OD2	1:A:111:LYS:HE3	1.84	0.78
1:B:242:LEU:HD12	1:B:473[A]:MET:HG3	1.67	0.76

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:59[B]:ASP:OD1	8:B:1513:GOL:C3	2.33	0.76
1:A:416:HIS:HB2	9:A:1546:HOH:O	1.86	0.75
1:A:489:ALA:HB3	9:A:1684:HOH:O	1.87	0.74
1:B:356:MET:HE2	1:B:394:PHE:CE2	2.24	0.73
1:A:82[B]:GLU:CD	9:A:1649:HOH:O	2.28	0.70
1:A:172:LEU:HD11	9:A:1835:HOH:O	1.92	0.70
1:B:59[A]:ASP:OD2	8:B:1513:GOL:H11	1.90	0.70
1:B:180:ARG:HD2	1:B:188:LYS:HG2	1.72	0.69
8:B:1512:GOL:H12	9:B:1862:HOH:O	1.91	0.69
1:A:438:VAL:HG13	1:A:450:LEU:CB	2.23	0.69
1:A:227:ASP:HB3	1:A:284:TYR:CZ	2.28	0.69
1:B:287:GLN:NE2	1:B:473[A]:MET:HE2	2.06	0.69
1:B:59[B]:ASP:HB2	8:B:1513:GOL:C1	2.05	0.68
3:A:1504:ACT:H2	9:A:1576:HOH:O	1.94	0.68
1:A:149:ASN:N	8:A:1516:GOL:H11	2.05	0.67
1:A:221:GLU:OE2	1:A:396:ARG:NH1	2.23	0.67
1:A:38[A]:VAL:HG13	1:A:47:ILE:O	1.94	0.67
1:B:287:GLN:NE2	1:B:473[A]:MET:CE	2.55	0.67
1:A:38[A]:VAL:CG1	1:A:46:VAL:HB	2.22	0.66
1:A:131[A]:GLN:HG2	9:A:1736:HOH:O	1.96	0.65
1:B:220[B]:ASN:CG	1:B:472[B]:MET:CE	2.62	0.65
1:B:356:MET:HE2	1:B:394:PHE:HE2	1.63	0.63
1:A:438:VAL:HG13	1:A:450:LEU:HB3	1.80	0.63
1:B:489:ALA:HB3	9:B:1705:HOH:O	1.98	0.62
1:B:361:GLN:HA	1:B:371[A]:VAL:HG22	1.81	0.61
1:B:61:LYS:HE2	8:B:1513:GOL:H12	1.84	0.60
1:A:27:MET:HE2	1:A:136:PRO:HB2	1.84	0.60
1:A:482:ASN:HD22	3:A:1506:ACT:H2	1.67	0.60
1:B:3:PRO:HB2	1:B:500:VAL:C	2.22	0.59
1:A:180:ARG:HD2	1:A:188:LYS:HG3	1.85	0.58
1:A:438:VAL:HG13	1:A:450:LEU:HB2	1.85	0.58
1:A:442:HIS:HA	1:A:447[B]:ARG:HH22	1.69	0.58
1:B:296:PRO:HB3	1:B:302:ASN:HD22	1.71	0.56
1:B:227:ASP:HB3	1:B:284[A]:TYR:CD2	2.41	0.56
1:A:38[A]:VAL:HG11	1:A:46:VAL:CG2	2.36	0.56
1:B:227:ASP:HB3	1:B:284[A]:TYR:CE2	2.40	0.56
1:B:121:THR:HG23	9:B:1692:HOH:O	2.04	0.56
1:B:361:GLN:HA	1:B:371[A]:VAL:HG21	1.88	0.56
1:B:102:GLU:HB3	1:B:126:TYR:OH	2.06	0.56
1:A:470:ILE:HG22	9:A:1990:HOH:O	2.06	0.55
1:A:103:LEU:HB2	1:A:132:GLU:OE2	2.06	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:276:LYS:HE2	1:B:289:VAL:HG21	1.89	0.55
1:B:442[B]:HIS:HE1	9:B:1689:HOH:O	1.89	0.55
1:B:442[B]:HIS:CE1	9:B:1689:HOH:O	2.59	0.55
1:B:59[B]:ASP:OD1	8:B:1513:GOL:C2	2.53	0.54
8:B:1512:GOL:C1	9:B:1862:HOH:O	2.52	0.54
1:A:495:GLU:CD	1:A:495:GLU:H	2.11	0.53
1:A:395:HIS:ND1	3:A:1507:ACT:H2	2.24	0.53
1:B:414:PRO:HA	1:B:419:PHE:CD1	2.44	0.52
1:B:218:TYR:CE2	1:B:472[A]:MET:HE2	2.45	0.52
1:B:265:VAL:O	1:B:269:LEU:HG	2.10	0.52
1:B:218:TYR:HE2	1:B:472[A]:MET:HE2	1.76	0.51
1:B:62:THR:CG2	9:B:1884:HOH:O	2.59	0.51
1:B:210:GLU:HG3	1:B:232:PHE:CZ	2.46	0.51
1:B:210:GLU:OE1	9:B:1527:HOH:O	2.19	0.50
3:A:1506:ACT:H1	9:A:1801:HOH:O	2.12	0.49
1:B:19:PRO:HG3	1:B:142:ILE:HB	1.94	0.49
1:A:329:GLY:HA2	9:A:1939:HOH:O	2.13	0.48
1:B:218:TYR:CD2	1:B:472[A]:MET:HE3	2.48	0.48
1:B:219:GLY:HA2	1:B:472[A]:MET:CE	2.44	0.48
1:A:441:THR:O	1:A:447[B]:ARG:NH1	2.42	0.48
1:B:59[B]:ASP:HB3	8:B:1513:GOL:C1	2.15	0.47
1:A:414:PRO:HA	1:A:419:PHE:CG	2.48	0.47
1:A:482:ASN:HB3	3:A:1506:ACT:H2	1.97	0.47
1:A:3:PRO:HG3	1:A:479[A]:GLU:HG3	1.97	0.47
1:A:97:ARG:O	1:A:97:ARG:NE	2.45	0.47
1:B:328:ALA:HA	1:B:329:GLY:HA2	1.65	0.47
1:B:59[B]:ASP:HB3	8:B:1513:GOL:H12	1.95	0.46
1:B:105[A]:ASN:ND2	9:B:1878:HOH:O	2.42	0.46
1:B:242:LEU:CD1	1:B:473[A]:MET:HG3	2.41	0.46
1:B:273:VAL:HB	9:B:1845:HOH:O	2.16	0.46
1:A:438:VAL:CG1	1:A:450:LEU:HB2	2.46	0.45
1:A:236:PRO:HA	1:B:452[A]:ARG:CZ	2.47	0.45
1:A:125:ALA:O	1:A:442:HIS:HE1	2.00	0.45
1:A:227:ASP:HB3	1:A:284:TYR:CE1	2.53	0.44
1:B:435:ILE:O	1:B:438:VAL:HG12	2.17	0.44
1:B:219:GLY:HA2	1:B:472[A]:MET:HE3	2.00	0.44
1:B:27:MET:HE2	1:B:136:PRO:HB2	1.99	0.43
1:B:210:GLU:HG3	1:B:232:PHE:HZ	1.82	0.43
1:B:382:TYR:OH	3:B:1503:ACT:H2	2.18	0.43
1:A:103:LEU:HD22	1:A:107:ILE:HG13	2.00	0.42
1:B:364:MET:SD	1:B:371[A]:VAL:HG11	2.60	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:444:GLU:OE2	1:A:447[A]:ARG:NH1	2.52	0.42
1:B:362:ALA:O	1:B:366[B]:GLN:HG2	2.19	0.42
1:B:4:ASP:OD1	1:B:192:LYS:NZ	2.50	0.42
1:B:7:THR:HG22	1:B:214:ILE:HG22	2.01	0.42
1:A:251:LEU:HD11	1:A:360[A]:ILE:HD13	2.02	0.42
1:B:218:TYR:CE2	1:B:472[A]:MET:CE	3.02	0.42
1:B:153:MET:CE	9:B:1885:HOH:O	2.56	0.42
1:B:59[B]:ASP:CB	8:B:1513:GOL:HO1	1.84	0.42
1:B:226:LEU:CD2	1:B:473[B]:MET:HE1	2.49	0.42
1:A:46:VAL:HG21	1:A:130:LEU:HB3	2.01	0.42
1:B:62:THR:HG23	9:B:1884:HOH:O	2.20	0.42
1:A:342:ILE:CG2	1:A:392:MET:HG3	2.50	0.41
1:B:59[A]:ASP:HB2	8:B:1513:GOL:C1	2.18	0.41
1:B:283[B]:LEU:HD12	1:B:287:GLN:HG3	2.02	0.41
1:B:299:PRO:O	1:B:300:TYR:HB2	2.21	0.41
1:B:212:GLY:HA2	1:B:477[B]:LYS:HZ1	1.86	0.41
1:B:71:VAL:HG22	1:B:185:TRP:CG	2.55	0.41
1:A:414:PRO:HA	1:A:419:PHE:CD1	2.56	0.41
1:B:389[B]:ARG:NH2	9:B:1888:HOH:O	2.54	0.41
1:B:303:LEU:HD22	1:B:452[A]:ARG:HG3	2.03	0.40
1:B:40:TYR:CE1	1:B:401:PRO:HB3	2.57	0.40
1:A:186:GLY:HA3	9:A:1989:HOH:O	2.21	0.40
1:A:28:PHE:C	1:A:28:PHE:CD2	2.95	0.40

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	518/502 (103%)	504 (97%)	14 (3%)	0	100	100
1	B	519/502 (103%)	504 (97%)	14 (3%)	1 (0%)	52	35

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	1037/1004 (103%)	1008 (97%)	28 (3%)	1 (0%)	56	38

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	499	PRO

### 5.3.2 Protein sidechains ⓘ

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	445/425 (105%)	429 (96%)	16 (4%)	42	24
1	B	445/425 (105%)	421 (95%)	24 (5%)	27	11
All	All	890/850 (105%)	850 (96%)	40 (4%)	37	16

All (40) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	62	THR
1	A	97	ARG
1	A	103	LEU
1	A	127	TYR
1	A	171	LYS
1	A	188	LYS
1	A	216	LEU
1	A	242	LEU
1	A	250[A]	MET
1	A	250[B]	MET
1	A	253	LEU
1	A	319	LEU
1	A	330	LYS
1	A	373	LEU
1	A	438	VAL
1	A	473	MET
1	B	23[A]	THR

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Mol	Chain	Res	Type
1	B	23[B]	THR
1	B	58	GLU
1	B	62	THR
1	B	105[A]	ASN
1	B	105[B]	ASN
1	B	121	THR
1	B	127	TYR
1	B	179	VAL
1	B	188	LYS
1	B	216	LEU
1	B	250[A]	MET
1	B	250[B]	MET
1	B	276	LYS
1	B	309	GLN
1	B	319	LEU
1	B	321	LYS
1	B	331	ASP
1	B	373	LEU
1	B	386	ARG
1	B	439	LEU
1	B	479[A]	GLU
1	B	479[B]	GLU
1	B	484	PRO

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

Mol	Chain	Res	Type
1	A	442	HIS
1	A	482	ASN
1	B	197	ASN
1	B	287	GLN
1	B	302	ASN
1	B	309	GLN
1	B	336	ASN
1	B	416	HIS
1	B	423	GLN
1	B	446	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 5.6 Ligand geometry ⓘ

Of 28 ligands modelled in this entry, 7 are monoatomic - leaving 21 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	ACT	A	1502	-	1,3,3	0.95	0	0,3,3	0.00	-
3	ACT	A	1503	-	1,3,3	1.30	0	0,3,3	0.00	-
3	ACT	A	1504	-	1,3,3	0.89	0	0,3,3	0.00	-
3	ACT	A	1505	-	1,3,3	1.60	0	0,3,3	0.00	-
3	ACT	A	1506	-	1,3,3	0.97	0	0,3,3	0.00	-
3	ACT	A	1507	-	1,3,3	0.98	0	0,3,3	0.00	-
4	SO4	A	1508	-	4,4,4	0.35	0	6,6,6	0.31	0
6	EDT	A	1513[A]	-	7,19,19	0.39	0	12,24,24	1.36	3 (25%)
6	EDT	A	1513[B]	2	7,19,19	0.35	0	12,24,24	1.39	3 (25%)
7	DTT	A	1514[A]	-	7,7,7	12.47	1 (14%)	4,8,8	2.98	2 (50%)
7	DTT	A	1514[B]	-	7,7,7	12.46	1 (14%)	4,8,8	2.14	1 (25%)
8	GOL	A	1515	-	5,5,5	0.37	0	5,5,5	0.37	0
8	GOL	A	1516	-	5,5,5	0.46	0	5,5,5	0.55	0
8	GOL	A	1517	-	5,5,5	0.39	0	5,5,5	0.30	0
3	ACT	B	1503	-	1,3,3	0.45	0	0,3,3	0.00	-
3	ACT	B	1504	-	1,3,3	1.27	0	0,3,3	0.00	-
3	ACT	B	1505	-	1,3,3	1.48	0	0,3,3	0.00	-
6	EDT	B	1511[A]	2	7,19,19	0.93	0	12,24,24	1.93	4 (33%)
6	EDT	B	1511[B]	-	7,19,19	0.93	0	12,24,24	2.21	5 (41%)
8	GOL	B	1512	-	5,5,5	0.30	0	5,5,5	1.06	0
8	GOL	B	1513	1	5,5,5	0.31	0	5,5,5	0.41	0

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	ACT	A	1502	-	-	0/0/0/0	0/0/0/0
3	ACT	A	1503	-	-	0/0/0/0	0/0/0/0
3	ACT	A	1504	-	-	0/0/0/0	0/0/0/0
3	ACT	A	1505	-	-	0/0/0/0	0/0/0/0
3	ACT	A	1506	-	-	0/0/0/0	0/0/0/0
3	ACT	A	1507	-	-	0/0/0/0	0/0/0/0
4	SO4	A	1508	-	-	0/0/0/0	0/0/0/0
6	EDT	A	1513[A]	-	-	0/13/21/21	0/0/0/0
6	EDT	A	1513[B]	2	-	0/13/21/21	0/0/0/0
7	DTT	A	1514[A]	-	-	0/8/8/8	0/0/0/0
7	DTT	A	1514[B]	-	-	0/8/8/8	0/0/0/0
8	GOL	A	1515	-	-	0/4/4/4	0/0/0/0
8	GOL	A	1516	-	-	0/4/4/4	0/0/0/0
8	GOL	A	1517	-	-	0/4/4/4	0/0/0/0
3	ACT	B	1503	-	-	0/0/0/0	0/0/0/0
3	ACT	B	1504	-	-	0/0/0/0	0/0/0/0
3	ACT	B	1505	-	-	0/0/0/0	0/0/0/0
6	EDT	B	1511[A]	2	-	0/13/21/21	0/0/0/0
6	EDT	B	1511[B]	-	-	0/13/21/21	0/0/0/0
8	GOL	B	1512	-	-	0/4/4/4	0/0/0/0
8	GOL	B	1513	1	-	0/4/4/4	0/0/0/0

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	1514[A]	DTT	C4-S4	-32.94	1.08	1.81
7	A	1514[B]	DTT	C4-S4	-32.94	1.08	1.81

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	1514[A]	DTT	C2-C1-S1	-4.52	106.42	113.91
6	B	1511[A]	EDT	C1-C2-N3	-3.35	108.56	113.53
6	B	1511[B]	EDT	C1-C2-N3	-3.35	108.56	113.53
6	B	1511[A]	EDT	C10-C9-N8	-2.90	109.23	113.53
6	B	1511[A]	EDT	C2-N3-C6	-2.83	105.36	111.28
6	B	1511[B]	EDT	C2-N3-C6	-2.83	105.36	111.28
6	A	1513[B]	EDT	C5-C4-N3	-2.30	110.12	113.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	1513[A]	EDT	C5-C4-N3	-2.30	110.12	113.53
6	A	1513[B]	EDT	C1-C2-N3	-2.28	110.16	113.53
6	A	1513[B]	EDT	C10-C9-N8	-2.21	110.25	113.53
6	A	1513[A]	EDT	C10-C9-N8	-2.21	110.25	113.53
6	A	1513[A]	EDT	C1-C2-N3	2.17	116.75	113.53
6	B	1511[A]	EDT	C11-N8-C9	2.80	115.51	110.73
6	B	1511[B]	EDT	C11-N8-C9	2.80	115.51	110.73
6	B	1511[B]	EDT	C12-C11-N8	3.14	118.19	113.53
7	A	1514[A]	DTT	C3-C4-S4	3.39	119.53	113.91
7	A	1514[B]	DTT	C3-C4-S4	3.39	119.53	113.91
6	B	1511[B]	EDT	C10-C9-N8	3.55	118.79	113.53

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

9 monomers are involved in 39 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1504	ACT	1	0
3	A	1506	ACT	3	0
3	A	1507	ACT	1	0
6	A	1513[A]	EDT	1	0
8	A	1516	GOL	2	0
3	B	1503	ACT	1	0
3	B	1504	ACT	1	0
8	B	1512	GOL	2	0
8	B	1513	GOL	27	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 ⓘ

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	499/502 (99%)	-0.28	11 (2%) 65 60	9, 16, 28, 38	3 (0%)
1	B	499/502 (99%)	-0.05	24 (4%) 34 28	10, 19, 39, 50	6 (1%)
All	All	998/1004 (99%)	-0.16	35 (3%) 48 42	9, 17, 33, 50	9 (0%)

All (35) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	500	VAL	6.9
1	B	3	PRO	5.4
1	B	327	PRO	4.9
1	B	125	ALA	4.8
1	B	2	ALA	4.7
1	B	328	ALA	4.2
1	A	442	HIS	3.9
1	B	59[A]	ASP	3.8
1	A	3	PRO	3.7
1	B	331	ASP	3.4
1	B	329	GLY	3.3
1	B	330	LYS	3.3
1	B	337	GLY	3.2
1	A	329	GLY	3.1
1	B	365	ARG	3.0
1	B	336	ASN	2.9
1	B	57	SER	2.8
1	B	338	GLN	2.8
1	A	328	ALA	2.8
1	A	173	ASN	2.8
1	A	172	LEU	2.7
1	A	382	TYR	2.7
1	B	122	LEU	2.7
1	B	284[A]	TYR	2.6

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Mol	Chain	Res	Type	RSRZ
1	B	4	ASP	2.6
1	A	336	ASN	2.5
1	B	108	VAL	2.4
1	A	175	TYR	2.3
1	B	499	PRO	2.3
1	B	96	GLN	2.3
1	A	337	GLY	2.2
1	A	38[A]	VAL	2.2
1	B	121	THR	2.0
1	B	124	SER	2.0
1	B	498	LYS	2.0

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

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

## 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
8	GOL	A	1517	6/6	0.59	0.69	27.63	31,38,39,39	6
3	ACT	A	1505	4/4	0.67	0.18	9.72	26,28,28,29	0
3	ACT	A	1502	4/4	0.74	0.18	9.28	38,39,39,40	0
6	EDT	B	1511[A]	20/20	0.91	0.17	4.98	17,30,32,32	6
6	EDT	A	1513[B]	20/20	0.87	0.17	4.78	22,32,35,35	4
6	EDT	A	1513[A]	20/20	0.87	0.17	4.78	22,34,37,37	4
3	ACT	B	1504	4/4	0.88	0.23	3.84	51,52,52,52	0
7	DTT	A	1514[B]	8/8	0.84	0.17	3.79	24,33,36,54	2
6	EDT	B	1511[B]	20/20	0.91	0.17	3.15	17,31,33,33	6
7	DTT	A	1514[A]	8/8	0.84	0.17	2.80	31,33,36,54	2

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
3	ACT	A	1507	4/4	0.84	0.24	2.63	34,35,35,36	0
3	ACT	A	1506	4/4	0.71	0.26	2.52	54,54,54,54	0
8	GOL	A	1515	6/6	0.93	0.11	1.92	25,31,32,35	0
8	GOL	B	1513	6/6	0.70	0.41	1.66	36,36,37,37	6
3	ACT	B	1505	4/4	0.73	0.20	1.35	38,38,38,39	0
5	CL	A	1512	1/1	0.83	0.11	1.21	62,62,62,62	0
8	GOL	B	1512	6/6	0.91	0.13	0.70	26,30,32,34	0
4	SO4	A	1508	5/5	0.97	0.08	-0.84	34,35,36,36	0
3	ACT	B	1503	4/4	0.90	0.16	-	33,33,33,33	0
8	GOL	A	1516	6/6	0.73	0.23	-	41,42,43,44	0
3	ACT	A	1503	4/4	0.88	0.17	-	39,39,39,39	0
5	CL	B	1506	1/1	0.97	0.06	-	38,38,38,38	0
5	CL	A	1511	1/1	0.74	0.24	-	71,71,71,71	0
5	CL	A	1509	1/1	0.92	0.20	-	45,45,45,45	0
2	FE	B	1502	1/1	0.99	0.03	-	23,23,23,23	1
5	CL	A	1510	1/1	0.99	0.12	-	39,39,39,39	0
2	FE	A	1501	1/1	0.99	0.04	-	19,19,19,19	1
3	ACT	A	1504	4/4	0.91	0.14	-	39,40,40,40	0

## 6.5 Other polymers

There are no such residues in this entry.