



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 15, 2017 – 12:56 am GMT

PDB ID : 4NB8
Title : Oxygenase with Ile262 replaced by Leu and ferredoxin complex of carbazole
1,9a-dioxygenase
Authors : Ashikawa, Y.; Usami, Y.; Inoue, K.; Nojiri, H.
Deposited on : 2013-10-23
Resolution : 2.01 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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

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 : trunk28620
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) : recalc28949

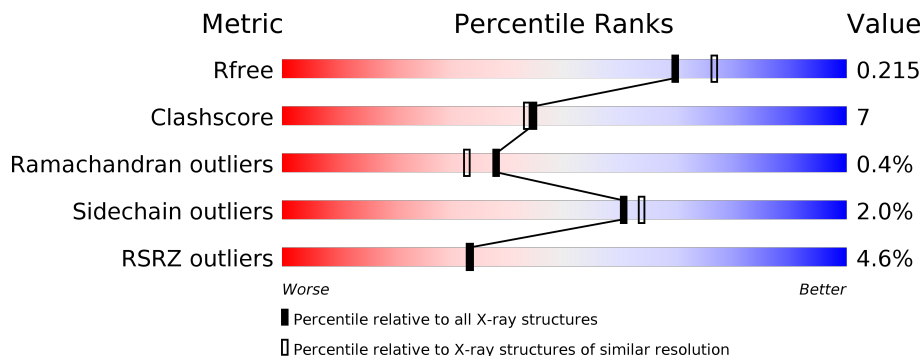
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.01 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	6609 (2.00-2.00)
Clashscore	112137	7775 (2.00-2.00)
Ramachandran outliers	110173	7679 (2.00-2.00)
Sidechain outliers	110143	7678 (2.00-2.00)
RSRZ outliers	101464	6696 (2.00-2.00)

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 ≥ 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	392	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 1%, orange 1%, yellow 16%, green 83%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> % 83% 16% . </div> </div>
1	B	392	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 2%, orange 2%, yellow 20%, green 78%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> 2% 78% 20% .. </div> </div>
1	C	392	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 1%, orange 1%, yellow 20%, green 78%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> % 78% 20% .. </div> </div>
2	D	115	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 32%, orange 32%, yellow 10%, green 82%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> 32% 82% 10% 9% </div> </div>
2	E	115	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 3%, orange 3%, yellow 15%, green 81%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> 3% 81% 15% . </div> </div>
2	F	115	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 10%, orange 10%, yellow 11%, green 79%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> 10% 79% 11% 10% </div> </div>

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 12776 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 Terminal oxygenase component of carbazole.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	388	Total	C	N	O	S	0	0	0
			3128	1999	534	582	13			
1	B	388	Total	C	N	O	S	0	0	0
			3128	1999	534	582	13			
1	C	388	Total	C	N	O	S	0	0	0
			3128	1999	534	582	13			

There are 27 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	262	LEU	ILE	ENGINEERED MUTATION	UNP Q84II6
A	385	LEU	-	EXPRESSION TAG	UNP Q84II6
A	386	GLU	-	EXPRESSION TAG	UNP Q84II6
A	387	HIS	-	EXPRESSION TAG	UNP Q84II6
A	388	HIS	-	EXPRESSION TAG	UNP Q84II6
A	389	HIS	-	EXPRESSION TAG	UNP Q84II6
A	390	HIS	-	EXPRESSION TAG	UNP Q84II6
A	391	HIS	-	EXPRESSION TAG	UNP Q84II6
A	392	HIS	-	EXPRESSION TAG	UNP Q84II6
B	262	LEU	ILE	ENGINEERED MUTATION	UNP Q84II6
B	385	LEU	-	EXPRESSION TAG	UNP Q84II6
B	386	GLU	-	EXPRESSION TAG	UNP Q84II6
B	387	HIS	-	EXPRESSION TAG	UNP Q84II6
B	388	HIS	-	EXPRESSION TAG	UNP Q84II6
B	389	HIS	-	EXPRESSION TAG	UNP Q84II6
B	390	HIS	-	EXPRESSION TAG	UNP Q84II6
B	391	HIS	-	EXPRESSION TAG	UNP Q84II6
B	392	HIS	-	EXPRESSION TAG	UNP Q84II6
C	262	LEU	ILE	ENGINEERED MUTATION	UNP Q84II6
C	385	LEU	-	EXPRESSION TAG	UNP Q84II6
C	386	GLU	-	EXPRESSION TAG	UNP Q84II6
C	387	HIS	-	EXPRESSION TAG	UNP Q84II6
C	388	HIS	-	EXPRESSION TAG	UNP Q84II6

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Chain	Residue	Modelled	Actual	Comment	Reference
C	389	HIS	-	EXPRESSION TAG	UNP Q84II6
C	390	HIS	-	EXPRESSION TAG	UNP Q84II6
C	391	HIS	-	EXPRESSION TAG	UNP Q84II6
C	392	HIS	-	EXPRESSION TAG	UNP Q84II6

- Molecule 2 is a protein called Ferredoxin CarAc.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	105	Total	C	N	O	S	0	0	0
			776	489	130	150	7			
2	E	110	Total	C	N	O	S	0	0	0
			822	515	141	159	7			
2	F	104	Total	C	N	O	S	0	0	0
			768	483	129	149	7			

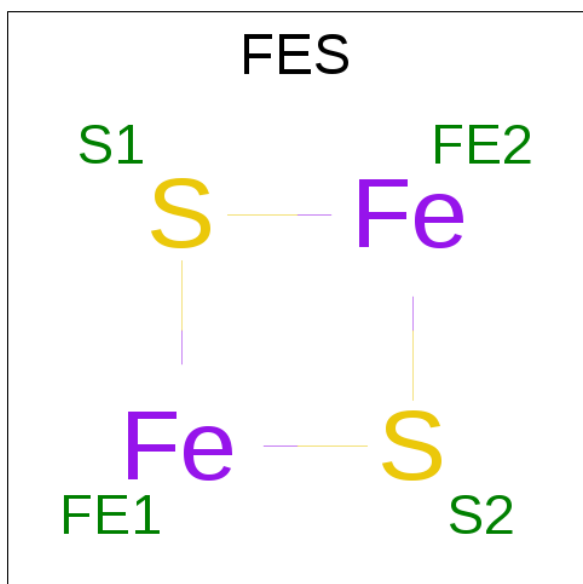
There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	108	LEU	-	EXPRESSION TAG	UNP Q8GI16
D	109	GLU	-	EXPRESSION TAG	UNP Q8GI16
D	110	HIS	-	EXPRESSION TAG	UNP Q8GI16
D	111	HIS	-	EXPRESSION TAG	UNP Q8GI16
D	112	HIS	-	EXPRESSION TAG	UNP Q8GI16
D	113	HIS	-	EXPRESSION TAG	UNP Q8GI16
D	114	HIS	-	EXPRESSION TAG	UNP Q8GI16
D	115	HIS	-	EXPRESSION TAG	UNP Q8GI16
E	108	LEU	-	EXPRESSION TAG	UNP Q8GI16
E	109	GLU	-	EXPRESSION TAG	UNP Q8GI16
E	110	HIS	-	EXPRESSION TAG	UNP Q8GI16
E	111	HIS	-	EXPRESSION TAG	UNP Q8GI16
E	112	HIS	-	EXPRESSION TAG	UNP Q8GI16
E	113	HIS	-	EXPRESSION TAG	UNP Q8GI16
E	114	HIS	-	EXPRESSION TAG	UNP Q8GI16
E	115	HIS	-	EXPRESSION TAG	UNP Q8GI16
F	108	LEU	-	EXPRESSION TAG	UNP Q8GI16
F	109	GLU	-	EXPRESSION TAG	UNP Q8GI16
F	110	HIS	-	EXPRESSION TAG	UNP Q8GI16
F	111	HIS	-	EXPRESSION TAG	UNP Q8GI16
F	112	HIS	-	EXPRESSION TAG	UNP Q8GI16
F	113	HIS	-	EXPRESSION TAG	UNP Q8GI16
F	114	HIS	-	EXPRESSION TAG	UNP Q8GI16
F	115	HIS	-	EXPRESSION TAG	UNP Q8GI16

- Molecule 3 is FE (II) ION (three-letter code: FE2) (formula: Fe).

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

- Molecule 4 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe₂S₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	Fe	S	0	0
			4	2	2		
4	B	1	Total	Fe	S	0	0
			4	2	2		
4	C	1	Total	Fe	S	0	0
			4	2	2		
4	D	1	Total	Fe	S	0	0
			4	2	2		
4	E	1	Total	Fe	S	0	0
			4	2	2		
4	F	1	Total	Fe	S	0	0
			4	2	2		

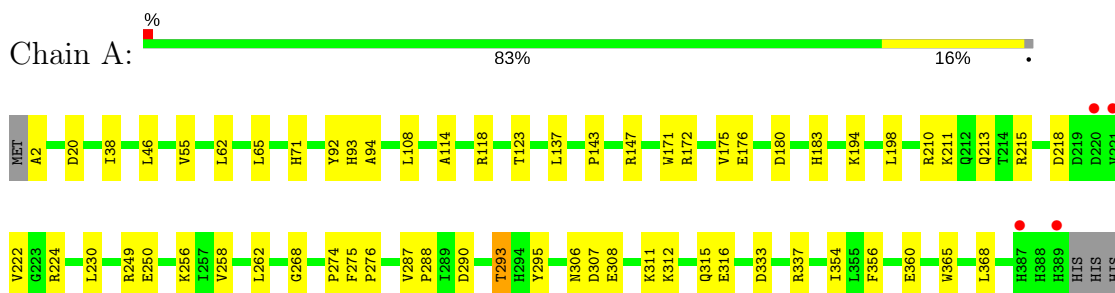
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	329	Total 329	O 329	0	0
5	B	290	Total 290	O 290	0	0
5	C	278	Total 278	O 278	0	0
5	D	26	Total 26	O 26	0	0
5	E	51	Total 51	O 51	0	0
5	F	25	Total 25	O 25	0	0

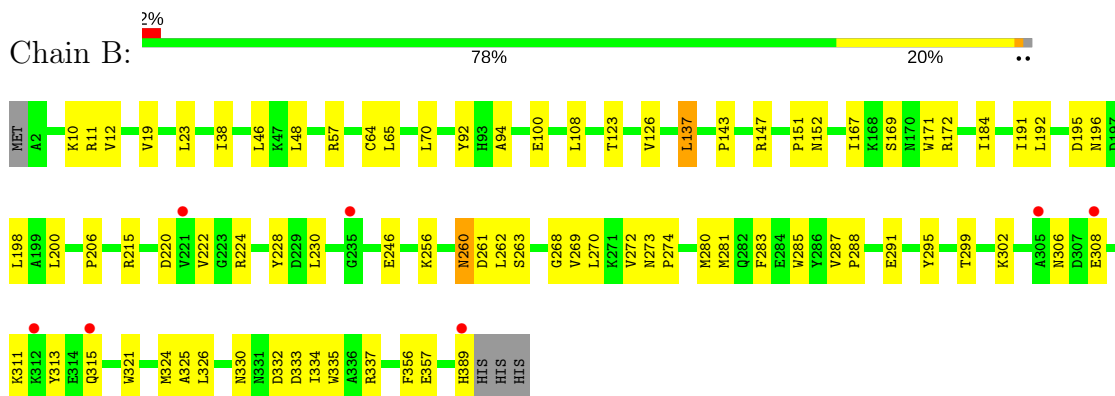
3 Residue-property plots

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.

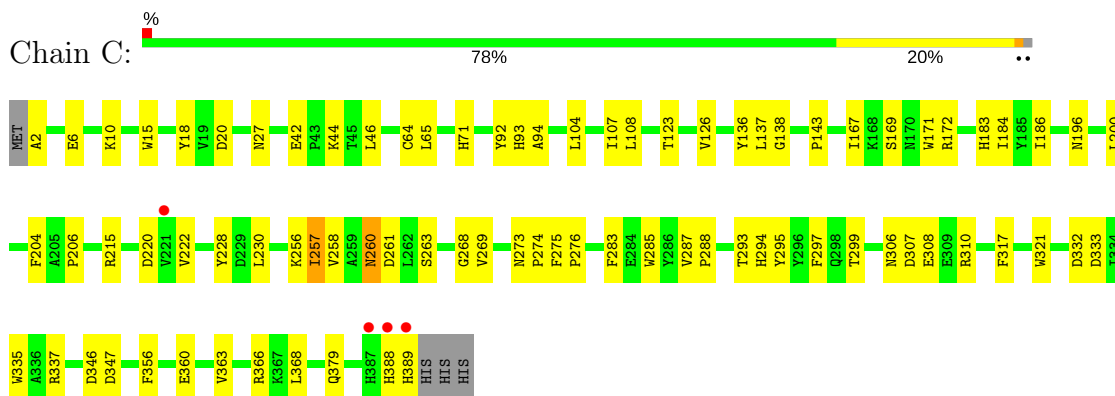
- Molecule 1: Terminal oxygenase component of carbazole



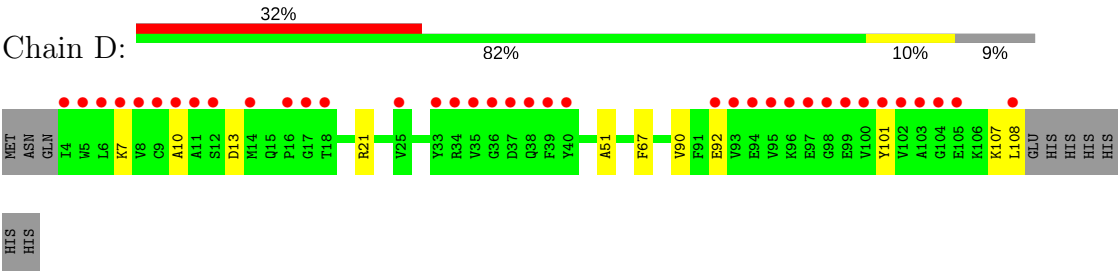
- Molecule 1: Terminal oxygenase component of carbazole



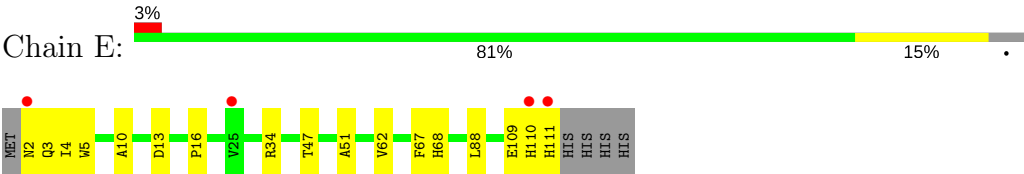
- Molecule 1: Terminal oxygenase component of carbazole



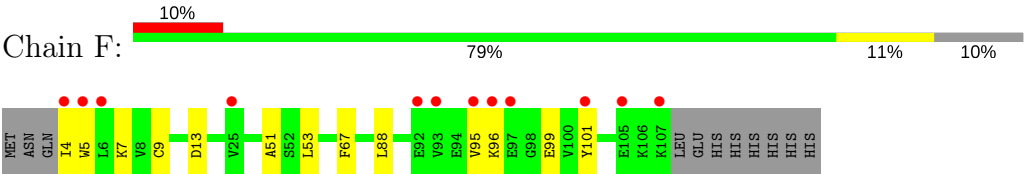
- Molecule 2: Ferredoxin CarAc



● Molecule 2: Ferredoxin CarAc



● Molecule 2: Ferredoxin CarAc



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	98.27Å 89.82Å 105.25Å 90.00° 104.04° 90.00°	Depositor
Resolution (Å)	47.87 – 2.01 47.87 – 2.01	Depositor EDS
% Data completeness (in resolution range)	99.2 (47.87-2.01) 99.2 (47.87-2.01)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.74 (at 2.00Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.190 , 0.216 0.188 , 0.215	Depositor DCC
R_{free} test set	5887 reflections (5.26%)	DCC
Wilson B-factor (Å ²)	28.5	Xtriage
Anisotropy	0.036	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 49.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	12776	wwPDB-VP
Average B, all atoms (Å ²)	31.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.86% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: FE2, FES

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	0.33	0/3213	0.61	0/4362
1	B	0.32	0/3213	0.60	0/4362
1	C	0.31	0/3213	0.59	0/4362
2	D	0.31	0/792	0.57	0/1077
2	E	0.32	0/840	0.63	0/1142
2	F	0.30	0/784	0.56	0/1066
All	All	0.32	0/12055	0.60	0/16371

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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	3128	0	3030	40	0
1	B	3128	0	3030	53	0
1	C	3128	0	3030	51	0
2	D	776	0	756	13	0
2	E	822	0	790	10	0
2	F	768	0	745	12	0
3	A	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	1	0	0	0	0
3	C	1	0	0	0	0
4	A	4	0	0	1	0
4	B	4	0	0	0	0
4	C	4	0	0	1	0
4	D	4	0	0	0	0
4	E	4	0	0	1	0
4	F	4	0	0	0	0
5	A	329	0	0	4	0
5	B	290	0	0	4	0
5	C	278	0	0	5	0
5	D	26	0	0	0	0
5	E	51	0	0	0	0
5	F	25	0	0	0	0
All	All	12776	0	11381	173	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 7.

All (173) 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:C:6:GLU:O	1:C:10:LYS:HG2	1.71	0.90
1:C:360:GLU:HG3	5:C:782:HOH:O	1.80	0.80
1:B:11:ARG:HH21	1:C:388:HIS:CE1	2.01	0.78
1:A:114:ALA:O	1:A:118:ARG:HD3	1.85	0.76
1:A:210:ARG:NH2	2:D:21:ARG:HH12	1.83	0.76
1:A:290:ASP:OD1	1:A:293:THR:HG22	1.87	0.74
1:A:65:LEU:HD23	1:A:123:THR:HG22	1.70	0.73
1:C:2:ALA:HB3	5:C:838:HOH:O	1.88	0.73
2:D:7:LYS:HG2	2:D:101:TYR:HE1	1.52	0.73
1:C:65:LEU:HD23	1:C:123:THR:HG22	1.75	0.69
2:E:110:HIS:CD2	2:E:111:HIS:H	2.12	0.68
1:B:389:HIS:O	1:B:389:HIS:ND1	2.27	0.68
1:B:281:MET:HE3	1:B:283:PHE:CZ	2.28	0.67
1:C:220:ASP:OD1	1:C:222:VAL:HG22	1.94	0.66
1:A:312:LYS:O	1:A:316:GLU:HG3	1.95	0.66
2:D:7:LYS:HG2	2:D:101:TYR:CE1	2.30	0.66
1:B:260:ASN:H	1:B:260:ASN:HD22	1.47	0.63
1:C:257:ILE:HD11	1:C:260:ASN:OD1	1.98	0.63
1:A:38:ILE:HD13	1:A:62:LEU:HD22	1.82	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:92:GLU:HG2	2:D:107:LYS:HD3	1.82	0.61
1:A:118:ARG:HD2	5:A:751:HOH:O	2.01	0.60
1:B:306:ASN:OD1	1:B:308:GLU:HB2	2.00	0.60
1:B:10:LYS:O	1:B:10:LYS:HD3	2.02	0.60
1:B:260:ASN:ND2	1:B:260:ASN:H	1.99	0.59
1:C:2:ALA:HB1	1:C:20:ASP:OD1	2.04	0.58
1:A:312:LYS:HE2	1:A:316:GLU:OE2	2.03	0.58
1:C:306:ASN:O	1:C:310:ARG:HG3	2.05	0.57
1:A:210:ARG:HH21	2:D:21:ARG:HH12	1.53	0.57
1:A:2:ALA:HB1	1:A:20:ASP:OD1	2.05	0.56
2:F:53:LEU:CD1	2:F:88:LEU:HD11	2.35	0.56
1:B:262:LEU:HD11	1:B:272:VAL:HG13	1.88	0.55
1:B:326:LEU:O	1:B:330:ASN:HB2	2.06	0.55
1:C:333:ASP:O	1:C:337:ARG:HG3	2.06	0.55
2:D:51:ALA:HB2	2:D:67:PHE:CG	2.42	0.55
2:F:4:ILE:HG13	2:F:5:TRP:N	2.22	0.54
1:C:260:ASN:C	1:C:260:ASN:HD22	2.11	0.54
1:C:94:ALA:HB1	1:C:108:LEU:HB2	1.89	0.54
1:C:261:ASP:HB3	1:C:273:ASN:O	2.08	0.54
1:B:220:ASP:OD1	1:B:222:VAL:HB	2.08	0.53
1:B:171:TRP:CE2	1:B:172:ARG:HG3	2.43	0.53
1:C:184:ILE:HD11	1:C:200:LEU:CD1	2.38	0.52
2:F:99:GLU:HB3	2:F:101:TYR:HE1	1.74	0.52
1:B:260:ASN:N	1:B:260:ASN:HD22	2.04	0.51
1:B:287:VAL:HB	1:B:295:TYR:HB2	1.93	0.51
1:B:283:PHE:HB2	1:B:299:THR:OG1	2.09	0.51
1:B:196:ASN:O	1:B:256:LYS:HD2	2.11	0.51
1:C:260:ASN:HD22	1:C:261:ASP:N	2.08	0.51
1:A:143:PRO:HG3	1:A:147:ARG:CZ	2.41	0.51
1:B:184:ILE:HD11	1:B:200:LEU:CD1	2.41	0.51
1:A:171:TRP:CE2	1:A:172:ARG:HG3	2.46	0.51
1:A:287:VAL:HB	1:A:295:TYR:HB2	1.92	0.50
1:B:167:ILE:HD12	1:B:334:ILE:HG23	1.92	0.50
2:F:7:LYS:HB2	2:F:7:LYS:NZ	2.26	0.50
1:B:215:ARG:HB3	1:B:228:TYR:HB2	1.94	0.50
1:B:38:ILE:HG23	1:B:57:ARG:HH21	1.75	0.50
2:E:3:GLN:HG2	2:E:4:ILE:N	2.26	0.50
1:B:224:ARG:NH2	5:B:828:HOH:O	2.44	0.49
1:C:183:HIS:O	1:C:186:ILE:HG12	2.12	0.49
2:E:16:PRO:HA	2:E:34:ARG:HG2	1.93	0.49
2:F:4:ILE:HG13	2:F:5:TRP:CD1	2.47	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:7:LYS:HB2	2:F:7:LYS:HZ2	1.77	0.49
2:F:51:ALA:HB2	2:F:67:PHE:CG	2.46	0.49
1:B:273:ASN:OD1	1:B:281:MET:HG2	2.11	0.49
1:B:100:GLU:HG2	5:B:675:HOH:O	2.13	0.49
1:B:94:ALA:HB1	1:B:108:LEU:HB2	1.95	0.49
1:B:261:ASP:HB3	1:B:273:ASN:O	2.13	0.49
2:F:4:ILE:HG13	2:F:5:TRP:H	1.77	0.48
2:D:108:LEU:N	2:D:108:LEU:HD12	2.28	0.48
1:B:280:MET:HE3	1:B:313:TYR:HE1	1.78	0.48
1:B:333:ASP:O	1:B:337:ARG:HG3	2.13	0.48
1:C:64:CYS:HB2	1:C:126:VAL:CG2	2.44	0.48
1:C:379:GLN:NE2	5:C:617:HOH:O	2.44	0.48
1:A:210:ARG:HD3	1:A:360:GLU:OE2	2.14	0.47
1:B:311:LYS:O	1:B:315:GLN:HG3	2.14	0.47
1:C:258:VAL:HB	1:C:274:PRO:O	2.14	0.47
1:B:260:ASN:HD22	1:B:261:ASP:N	2.13	0.47
1:C:27:ASN:HA	1:C:138:GLY:HA3	1.96	0.47
1:A:215:ARG:HB2	1:A:230:LEU:HD11	1.96	0.47
1:A:198:LEU:HD23	1:A:256:LYS:HB2	1.97	0.47
1:A:306:ASN:OD1	1:A:308:GLU:HB2	2.13	0.47
1:B:196:ASN:HD22	1:B:198:LEU:HD21	1.80	0.47
1:B:281:MET:HE3	1:B:283:PHE:HZ	1.76	0.47
1:B:222:VAL:HG12	1:B:222:VAL:O	2.15	0.47
1:C:317:PHE:HA	1:C:321:TRP:HB2	1.97	0.47
1:C:94:ALA:CB	1:C:108:LEU:HB2	2.45	0.46
2:E:110:HIS:CG	2:E:111:HIS:H	2.33	0.46
1:C:287:VAL:HB	1:C:295:TYR:HB2	1.97	0.46
1:B:23:LEU:HD23	5:B:713:HOH:O	2.15	0.46
2:E:10:ALA:HB3	2:E:13:ASP:OD2	2.15	0.46
1:B:302:LYS:HD3	1:B:313:TYR:CD1	2.51	0.46
1:A:249:ARG:HG3	1:A:250:GLU:N	2.31	0.46
1:C:332:ASP:HA	1:C:335:TRP:NE1	2.30	0.46
1:A:94:ALA:HB1	1:A:108:LEU:HB2	1.98	0.45
2:F:95:VAL:HA	2:F:99:GLU:O	2.16	0.45
2:D:108:LEU:CD1	2:D:108:LEU:H	2.28	0.45
2:E:47:THR:HG23	2:E:88:LEU:HD23	1.98	0.45
1:A:215:ARG:HD3	5:A:867:HOH:O	2.17	0.45
1:A:311:LYS:O	1:A:315:GLN:HG3	2.17	0.45
1:A:93:HIS:HB2	4:A:502:FES:S1	2.56	0.45
1:C:346:ASP:O	1:C:347:ASP:HB2	2.17	0.45
1:C:379:GLN:HB2	5:C:614:HOH:O	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:285:TRP:HB2	1:C:297:PHE:HB3	1.99	0.45
2:D:108:LEU:H	2:D:108:LEU:HD12	1.81	0.45
1:C:306:ASN:OD1	1:C:308:GLU:HB2	2.17	0.45
1:C:171:TRP:CE2	1:C:172:ARG:HG3	2.51	0.45
1:A:180:ASP:HB3	1:A:183:HIS:HB3	1.98	0.44
1:C:171:TRP:CG	1:C:288:PRO:HG3	2.51	0.44
2:E:51:ALA:HB2	2:E:67:PHE:CG	2.52	0.44
1:A:258:VAL:HB	1:A:274:PRO:O	2.18	0.44
1:C:93:HIS:HB2	4:C:502:FES:S1	2.57	0.44
1:A:175:VAL:HG11	1:A:365:TRP:CE2	2.53	0.44
1:C:257:ILE:O	1:C:257:ILE:HD13	2.17	0.44
1:A:38:ILE:CD1	1:A:55:VAL:HG12	2.49	0.43
1:C:273:ASN:HA	1:C:274:PRO:HA	1.86	0.43
1:A:210:ARG:HA	1:A:213:GLN:HG2	1.99	0.43
1:B:215:ARG:HB2	1:B:230:LEU:HD11	2.00	0.43
1:C:283:PHE:HB2	1:C:299:THR:OG1	2.18	0.43
1:C:42:GLU:HG2	1:C:44:LYS:HE3	2.01	0.43
2:D:51:ALA:HB2	2:D:67:PHE:CD2	2.54	0.43
1:B:94:ALA:CB	1:B:108:LEU:HB2	2.48	0.43
1:C:204:PHE:O	1:C:206:PRO:HD3	2.18	0.43
1:C:18:TYR:CE2	1:C:366:ARG:HG2	2.54	0.43
1:B:171:TRP:CG	1:B:288:PRO:HG3	2.53	0.43
1:A:215:ARG:CZ	5:A:759:HOH:O	2.67	0.43
1:B:65:LEU:HD23	1:B:123:THR:HG22	2.00	0.43
1:B:228:TYR:CD1	1:B:263:SER:HB3	2.53	0.43
1:A:354:ILE:HD12	1:B:70:LEU:HB3	2.00	0.43
1:B:332:ASP:HA	1:B:335:TRP:NE1	2.34	0.43
2:E:4:ILE:HG22	2:E:5:TRP:CD1	2.54	0.43
1:C:64:CYS:HB2	1:C:126:VAL:HG21	2.01	0.43
1:B:321:TRP:O	1:B:325:ALA:HB3	2.19	0.42
1:C:228:TYR:CD1	1:C:263:SER:HB3	2.54	0.42
1:B:273:ASN:HA	1:B:274:PRO:HA	1.88	0.42
1:C:215:ARG:HB2	1:C:230:LEU:HD11	2.01	0.42
1:C:196:ASN:O	1:C:256:LYS:HD2	2.19	0.42
2:D:10:ALA:HB3	2:D:13:ASP:OD2	2.18	0.42
1:A:218:ASP:OD1	1:A:218:ASP:O	2.37	0.42
1:B:64:CYS:HB2	1:B:126:VAL:CG2	2.49	0.42
1:C:167:ILE:HB	1:C:294:HIS:CE1	2.54	0.42
1:B:263:SER:O	1:B:270:LEU:HD12	2.19	0.42
1:C:260:ASN:H	1:C:260:ASN:ND2	2.16	0.42
1:C:136:TYR:CE1	1:C:143:PRO:HD2	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:269:VAL:HB	1:C:285:TRP:CD1	2.54	0.42
1:A:210:ARG:HH22	2:D:21:ARG:HH12	1.65	0.42
1:B:151:PRO:O	1:B:152:ASN:HB2	2.20	0.42
2:F:9:CYS:HB2	2:F:13:ASP:OD2	2.20	0.42
1:A:287:VAL:HA	1:A:288:PRO:HD3	1.91	0.41
1:A:333:ASP:O	1:A:337:ARG:HG3	2.20	0.41
1:B:12:VAL:HG21	1:B:19:VAL:HG21	2.02	0.41
1:B:48:LEU:HD23	1:B:137:LEU:HD23	2.02	0.41
1:A:194:LYS:HE3	5:A:901:HOH:O	2.19	0.41
2:F:53:LEU:HD11	2:F:88:LEU:HD11	2.01	0.41
1:A:65:LEU:CD2	1:A:123:THR:HG22	2.46	0.41
1:B:191:ILE:O	1:B:195:ASP:HB2	2.21	0.41
1:C:15:TRP:CZ3	1:C:363:VAL:HG13	2.55	0.41
2:E:68:HIS:HB2	4:E:201:FES:S2	2.60	0.41
1:B:291:GLU:HG2	5:B:698:HOH:O	2.20	0.41
1:B:206:PRO:HG2	1:B:357:GLU:HB3	2.03	0.41
1:C:293:THR:HG21	5:C:846:HOH:O	2.21	0.41
1:A:108:LEU:HD12	1:A:108:LEU:N	2.36	0.41
1:C:184:ILE:HD11	1:C:200:LEU:HD11	2.02	0.41
1:A:222:VAL:HG23	1:A:224:ARG:HG3	2.02	0.41
1:C:104:LEU:HD21	1:C:107:ILE:HD11	2.02	0.41
1:B:192:LEU:HD12	1:B:324:MET:SD	2.60	0.41
2:F:96:LYS:HE2	2:F:101:TYR:CZ	2.56	0.41
2:D:90:VAL:HG23	2:D:107:LYS:HE3	2.03	0.40
1:A:275:PHE:CG	1:A:276:PRO:HA	2.57	0.40
1:B:269:VAL:HB	1:B:285:TRP:CD1	2.56	0.40
1:A:176:GLU:O	1:A:180:ASP:HB2	2.21	0.40
1:A:211:LYS:H	1:A:211:LYS:HG3	1.63	0.40
1:B:143:PRO:HG3	1:B:147:ARG:CZ	2.52	0.40
1:C:275:PHE:CG	1:C:276:PRO:HA	2.57	0.40
1:C:389:HIS:CE1	2:E:62:VAL:HG21	2.57	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	386/392 (98%)	368 (95%)	16 (4%)	2 (0%)	32	26
1	B	386/392 (98%)	364 (94%)	21 (5%)	1 (0%)	44	40
1	C	386/392 (98%)	366 (95%)	18 (5%)	2 (0%)	32	26
2	D	103/115 (90%)	97 (94%)	6 (6%)	0	100	100
2	E	108/115 (94%)	102 (94%)	5 (5%)	1 (1%)	20	12
2	F	102/115 (89%)	99 (97%)	3 (3%)	0	100	100
All	All	1471/1521 (97%)	1396 (95%)	69 (5%)	6 (0%)	38	33

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	268	GLY
1	C	268	GLY
1	A	71	HIS
1	A	268	GLY
1	C	71	HIS
2	E	109	GLU

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	335/339 (99%)	327 (98%)	8 (2%)	54	56
1	B	335/339 (99%)	328 (98%)	7 (2%)	59	62
1	C	335/339 (99%)	326 (97%)	9 (3%)	50	51
2	D	83/93 (89%)	83 (100%)	0	100	100
2	E	88/93 (95%)	87 (99%)	1 (1%)	78	82
2	F	82/93 (88%)	82 (100%)	0	100	100
All	All	1258/1296 (97%)	1233 (98%)	25 (2%)	60	64

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	46	LEU
1	A	92	TYR
1	A	137	LEU
1	A	262	LEU
1	A	293	THR
1	A	307	ASP
1	A	356	PHE
1	A	368	LEU
1	B	46	LEU
1	B	92	TYR
1	B	137	LEU
1	B	169	SER
1	B	246	GLU
1	B	260	ASN
1	B	356	PHE
1	C	46	LEU
1	C	92	TYR
1	C	137	LEU
1	C	169	SER
1	C	257	ILE
1	C	260	ASN
1	C	307	ASP
1	C	356	PHE
1	C	368	LEU
2	E	2	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	165	GLN
1	A	379	GLN
1	B	260	ASN
1	C	165	GLN
1	C	260	ASN
1	C	379	GLN
1	C	389	HIS
2	E	2	ASN
2	E	110	HIS

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 9 ligands modelled in this entry, 3 are monoatomic - leaving 6 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	$\# Z > 2$
4	FES	A	502	1	0,4,4	0.00	-	0,4,4	0.00	-
4	FES	B	502	1	0,4,4	0.00	-	0,4,4	0.00	-
4	FES	C	502	1	0,4,4	0.00	-	0,4,4	0.00	-
4	FES	D	201	2	0,4,4	0.00	-	0,4,4	0.00	-
4	FES	E	201	2	0,4,4	0.00	-	0,4,4	0.00	-
4	FES	F	201	2	0,4,4	0.00	-	0,4,4	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
4	FES	A	502	1	-	0/0/4/4	0/1/1/1
4	FES	B	502	1	-	0/0/4/4	0/1/1/1
4	FES	C	502	1	-	0/0/4/4	0/1/1/1
4	FES	D	201	2	-	0/0/4/4	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	FES	E	201	2	-	0/0/4/4	0/1/1/1
4	FES	F	201	2	-	0/0/4/4	0/1/1/1

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.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	502	FES	1	0
4	C	502	FES	1	0
4	E	201	FES	1	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, 95th 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 ²)	Q<0.9
1	A	388/392 (98%)	-0.20	4 (1%) 82 82	18, 26, 41, 48	0
1	B	388/392 (98%)	-0.19	7 (1%) 69 68	19, 29, 45, 51	0
1	C	388/392 (98%)	-0.29	4 (1%) 82 82	21, 29, 42, 48	0
2	D	105/115 (91%)	1.14	37 (35%) 0 1	23, 39, 49, 51	0
2	E	110/115 (95%)	0.09	4 (3%) 43 44	25, 34, 45, 51	0
2	F	104/115 (90%)	0.45	12 (11%) 5 5	26, 39, 47, 52	0
All	All	1483/1521 (97%)	-0.06	68 (4%) 33 33	18, 30, 45, 52	0

All (68) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	E	2	ASN	5.9
2	D	108	LEU	5.4
2	D	101	TYR	4.9
2	F	101	TYR	4.5
2	D	4	ILE	4.4
2	D	5	TRP	4.3
2	D	98	GLY	4.2
2	E	111	HIS	4.2
2	F	107	LYS	4.1
2	D	37	ASP	4.1
2	F	25	VAL	4.1
2	F	105	GLU	4.1
2	F	95	VAL	3.9
2	D	38	GLN	3.9
2	D	95	VAL	3.8
2	D	93	VAL	3.7
1	C	389	HIS	3.6
1	A	389	HIS	3.6
2	D	92	GLU	3.6

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Mol	Chain	Res	Type	RSRZ
2	D	6	LEU	3.5
2	F	6	LEU	3.5
2	D	97	GLU	3.5
2	D	39	PHE	3.4
2	D	40	TYR	3.3
2	F	93	VAL	3.3
2	D	11	ALA	3.3
1	B	221	VAL	3.2
2	F	4	ILE	3.2
2	F	92	GLU	3.2
2	D	104	GLY	3.2
1	C	388	HIS	3.2
1	A	221	VAL	3.1
2	D	7	LYS	3.1
1	B	389	HIS	3.0
2	D	12	SER	2.9
2	D	9	CYS	2.9
1	A	387	HIS	2.9
2	D	8	VAL	2.8
1	B	315	GLN	2.8
2	D	100	VAL	2.8
2	F	96	LYS	2.8
2	D	36	GLY	2.6
2	D	25	VAL	2.6
2	D	94	GLU	2.6
1	B	308	GLU	2.5
2	D	16	PRO	2.5
2	D	96	LYS	2.5
2	D	18	THR	2.5
2	D	99	GLU	2.5
2	D	34	ARG	2.5
1	B	305	ALA	2.5
1	B	312	LYS	2.5
2	D	14	MET	2.5
2	D	35	VAL	2.4
2	F	5	TRP	2.4
2	D	105	GLU	2.4
1	C	221	VAL	2.4
2	D	10	ALA	2.4
2	F	97	GLU	2.4
2	D	33	TYR	2.4
2	D	103	ALA	2.3

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Mol	Chain	Res	Type	RSRZ
2	E	25	VAL	2.3
2	E	110	HIS	2.2
1	B	235	GLY	2.2
2	D	102	VAL	2.1
2	D	17	GLY	2.1
1	C	387	HIS	2.0
1	A	220	ASP	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, 95th 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 ²)	Q<0.9
4	FES	D	201	4/4	1.00	0.11	1.81	24,24,24,27	0
3	FE2	C	501	1/1	1.00	0.12	1.63	28,28,28,28	0
4	FES	B	502	4/4	0.99	0.11	1.40	18,20,21,21	0
4	FES	E	201	4/4	0.98	0.10	0.83	24,25,25,30	0
3	FE2	A	501	1/1	0.99	0.11	0.65	24,24,24,24	0
4	FES	A	502	4/4	0.99	0.12	0.35	22,22,22,22	0
3	FE2	B	501	1/1	0.99	0.12	-0.14	32,32,32,32	0
4	FES	C	502	4/4	0.99	0.09	-0.41	23,23,24,25	0
4	FES	F	201	4/4	0.99	0.08	-0.98	25,27,28,28	0

6.5 Other polymers [i](#)

There are no such residues in this entry.