



# Full wwPDB X-ray Structure Validation Report

Feb 28, 2014 – 08:03 PM GMT

PDB ID : 1H33  
Title : OXIDISED SOXAX COMPLEX FROM RHODOVULUM SULFIDOPHILUM  
Authors : Bamford, V.A.; Bruno, S.; Rasmussen, T.; Appia-Ayme, C.; Cheesman, M.R.; Berks, B.C.; Hemmings, A.M.  
Deposited on : 2002-08-21  
Resolution : 1.75 Å(reported)

This is a full wwPDB 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/ValidationPDFNotes.html>

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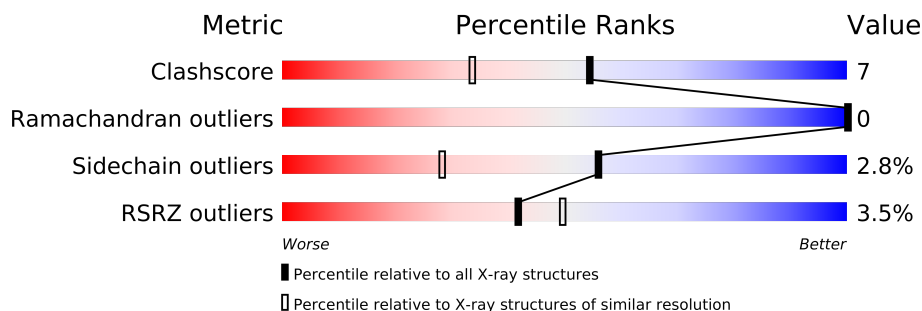
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.15 2013  
Xtriage (Phenix) : dev-1323  
EDS : stable22639  
Percentile statistics : 21963  
Refmac : 5.8.0049  
CCP4 : 6.3.0 (Settle)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)  
Validation Pipeline (wwPDB-VP) : stable22683

# 1 Overall quality at a glance

The reported resolution of this entry is 1.75 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	79885	1304 (1.76-1.76)
Ramachandran outliers	78287	1288 (1.76-1.76)
Sidechain outliers	78261	1288 (1.76-1.76)
RSRZ outliers	66119	1135 (1.76-1.76)

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. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	261	
2	B	138	

## 2 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 3518 atoms, of which 0 are hydrogen and 0 are deuterium.

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.

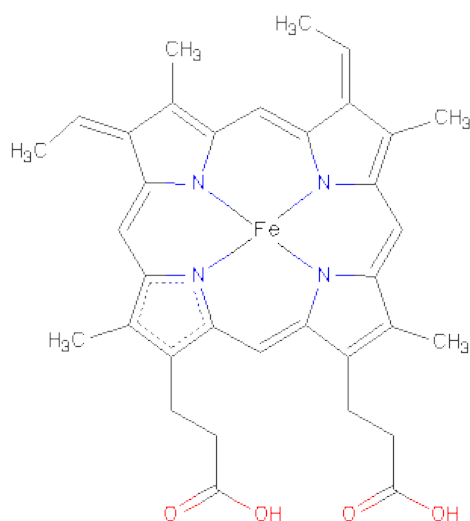
- Molecule 1 is a protein called DIHEME CYTOCHROME C.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	261	Total	C	N	O	S	0	0	0
			2031	1261	363	392	15			

- Molecule 2 is a protein called CYTOCHROME C.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	135	Total	C	N	O	S	0	0	1
			1005	630	175	192	8			

- Molecule 3 is HEME C (three-letter code: HEC) (formula:  $C_{34}H_{34}FeN_4O_4$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
3	A	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	B	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	270	Total	O	0	0
			270	270		
4	B	83	Total	O	0	0
			83	83		

### 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 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 ( $RSRZ > 2$ ). 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.

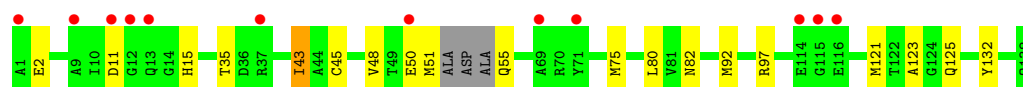
- Molecule 1: DIHEME CYTOCHROME C

Chain A: 



- Molecule 2: CYTOCHROME C

Chain B: 



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	66.35Å 87.34Å 71.65Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 1.75 25.56 – 1.75	Depositor EDS
% Data completeness (in resolution range)	93.4 (20.00-1.75) 86.9 (25.56-1.75)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.00 (at 1.75Å)	Xtriage
Refinement program	CNS	Depositor
R, $R_{free}$	0.179 , 0.217 0.177 , (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	DCC
Wilson B-factor (Å <sup>2</sup> )	16.6	Xtriage
Anisotropy	0.510	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.40 , 39.4	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtriage
Outliers	1 of 37010 reflections (0.003%)	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	3518	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	19.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.19% of the height of the origin peak. No significant pseudotranslation is detected.*

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

## 5 Model quality

### 5.1 Standard geometry

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

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	1.03	4/2070 (0.2%)	0.86	1/2805 (0.0%)
2	B	0.83	0/1025	0.85	0/1395
All	All	0.97	4/3095 (0.1%)	0.86	1/4200 (0.0%)

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

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	164	GLU	CG-CD	6.79	1.62	1.51
1	A	13	GLU	CB-CG	5.12	1.61	1.52
1	A	1	GLY	N-CA	5.11	1.53	1.46
1	A	13	GLU	CG-CD	5.05	1.59	1.51

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	91	ARG	NE-CZ-NH2	-5.17	117.72	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	244	TYR	Sidechain

## 5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2031	0	1926	17	0
2	B	1005	0	993	23	0
3	A	86	0	60	5	0
3	B	43	0	30	5	0
4	A	270	0	0	2	2
4	B	83	0	0	2	0
All	All	3518	0	3009	40	2

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 7.

All (40) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:216:HIS:HD2	1:A:234:GLY:H	1.10	0.99
2:B:48:VAL:HG21	2:B:51:MET:HE1	1.69	0.74
1:A:90:LEU:HD21	3:A:1262:HEC:HBA2	1.70	0.73
1:A:216:HIS:CD2	1:A:234:GLY:H	2.01	0.73
1:A:180:CYS:SG	3:A:1263:HEC:C3C	2.77	0.73
2:B:45:CYS:SG	3:B:1138:HEC:C3C	2.78	0.72
1:A:74:LYS:HE2	4:A:2092:HOH:O	1.92	0.69
2:B:48:VAL:HG11	2:B:51:MET:HE3	1.79	0.65
2:B:50:GLU:OE1	2:B:132:TYR:OH	2.16	0.64
1:A:209:ASN:HD21	1:A:213:ASN:HD21	1.47	0.62
2:B:51:MET:HE2	2:B:132:TYR:CE2	2.34	0.61
2:B:80:LEU:HD21	3:B:1138:HEC:HMB2	1.82	0.61
1:A:52:ASN:C	1:A:52:ASN:HD22	2.05	0.59
2:B:35:THR:HG22	2:B:43:ILE:HG21	1.88	0.56
2:B:43:ILE:H	2:B:43:ILE:CD1	2.20	0.55
1:A:99:GLU:HG2	4:A:2116:HOH:O	2.08	0.53
2:B:121:MET:HE2	2:B:125:GLN:HB3	1.92	0.52

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:106:THR:H	1:A:109:GLN:HE21	1.57	0.51
1:A:180:CYS:SG	3:A:1263:HEC:CBC	2.95	0.51
1:A:118:ARG:HB3	3:A:1262:HEC:HBC2	1.95	0.49
2:B:75:MET:HE2	4:B:2007:HOH:O	2.12	0.49
2:B:82:ASN:ND2	2:B:97:ARG:HD3	2.27	0.49
2:B:48:VAL:CG1	2:B:51:MET:HE3	2.41	0.48
1:A:111:ILE:HG12	3:A:1262:HEC:HMB2	1.94	0.48
2:B:48:VAL:HG11	2:B:51:MET:CE	2.44	0.47
2:B:11:ASP:OD1	2:B:11:ASP:C	2.52	0.47
1:A:116:THR:CG2	1:A:123:GLU:HG3	2.46	0.45
1:A:52:ASN:HD22	1:A:54:GLY:H	1.64	0.45
2:B:45:CYS:SG	3:B:1138:HEC:CBC	2.97	0.45
1:A:206:ARG:NH2	1:A:208:LYS:HE2	2.32	0.45
2:B:48:VAL:CG2	2:B:51:MET:HE1	2.42	0.44
2:B:2:GLU:OE2	2:B:123:ALA:HB3	2.18	0.44
2:B:43:ILE:HD13	2:B:43:ILE:N	2.33	0.43
1:A:39:THR:OG1	1:A:41:ASP:OD1	2.22	0.43
2:B:55:GLN:N	4:B:2033:HOH:O	2.52	0.42
2:B:43:ILE:CD1	2:B:43:ILE:N	2.82	0.42
2:B:92:MET:HB2	3:B:1138:HEC:CHD	2.50	0.41
2:B:92:MET:HB2	3:B:1138:HEC:C1D	2.51	0.41
1:A:52:ASN:ND2	1:A:54:GLY:H	2.18	0.41
2:B:43:ILE:H	2:B:43:ILE:HD13	1.84	0.41

All (2) 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	Distance(Å)	Clash(Å)
4:A:2138:HOH:O	4:A:2138:HOH:O[2_555]	1.53	0.67
4:A:2136:HOH:O	4:A:2136:HOH:O[2_555]	2.04	0.16

## 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	258/261 (99%)	252 (98%)	6 (2%)	0	100	100
2	B	131/138 (95%)	125 (95%)	6 (5%)	0	100	100
All	All	389/399 (98%)	377 (97%)	12 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 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	211/211 (100%)	204 (97%)	7 (3%)	50	22
2	B	107/109 (98%)	105 (98%)	2 (2%)	69	47
All	All	318/320 (99%)	309 (97%)	9 (3%)	56	28

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	21	PRO
1	A	52	ASN
1	A	62	ARG
1	A	99	GLU
1	A	186	ASP
1	A	209	ASN
1	A	216	HIS
2	B	15	HIS
2	B	43	ILE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	52	ASN
1	A	109	GLN
1	A	156	GLN
1	A	183	GLN
1	A	200	ASN

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Mol	Chain	Res	Type
1	A	209	ASN
1	A	216	HIS
2	B	15	HIS

### 5.3.3 RNA ⓘ

There are no RNA chains 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	CSS	A	222	1,3	5,6,7	7.77	1 (20%)	4,6,8	0.72	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
1	CSS	A	222	1,3	-	0/2/5/7	0/0/0/0

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	222	CSS	O-C	17.31	1.23	1.11

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

## 5.5 Carbohydrates

There are no carbohydrates in this entry.

## 5.6 Ligand geometry

3 ligands are 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	$\# Z  > 2$
3	HEC	A	1262	1	50,50,50	2.83	19 (38%)	56,82,82	2.18	22 (39%)
3	HEC	A	1263	1	50,50,50	2.41	15 (30%)	56,82,82	2.08	17 (30%)
3	HEC	B	1138	2	50,50,50	2.66	15 (30%)	56,82,82	2.14	19 (33%)

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	HEC	A	1262	1	-	0/10/54/54	0/0/8/8
3	HEC	A	1263	1	-	0/10/54/54	0/0/8/8
3	HEC	B	1138	2	-	0/10/54/54	0/0/8/8

All (49) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1262	HEC	C3C-CAC	9.06	1.54	1.35
3	B	1138	HEC	C3C-CAC	9.01	1.54	1.35
3	B	1138	HEC	C3B-CAB	8.76	1.53	1.35
3	A	1263	HEC	C3C-CAC	8.66	1.53	1.35
3	A	1263	HEC	C3B-CAB	8.22	1.52	1.35
3	A	1262	HEC	C1D-C2D	8.05	1.50	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1262	HEC	C3B-CAB	6.75	1.49	1.35
3	B	1138	HEC	C1D-C2D	6.63	1.48	1.40
3	A	1262	HEC	C3B-C4B	5.41	1.48	1.41
3	A	1262	HEC	C1B-C2B	5.39	1.46	1.40
3	A	1263	HEC	C3C-C4C	5.29	1.48	1.41
3	A	1263	HEC	C1C-C2C	5.17	1.46	1.40
3	B	1138	HEC	C4B-NB	5.11	1.44	1.37
3	A	1262	HEC	C3C-C4C	4.72	1.47	1.41
3	B	1138	HEC	C1C-C2C	4.56	1.45	1.40
3	A	1262	HEC	C1C-C2C	4.56	1.45	1.40
3	B	1138	HEC	CBD-CGD	-3.65	1.41	1.50
3	A	1263	HEC	C1B-C2B	2.95	1.43	1.40
3	A	1263	HEC	C4B-NB	2.93	1.41	1.37
3	A	1262	HEC	C4D-C3D	2.87	1.48	1.43
3	A	1263	HEC	O2D-CGD	-2.77	1.20	1.30
3	B	1138	HEC	C3C-C4C	2.65	1.45	1.41
3	B	1138	HEC	C4D-C3D	2.65	1.48	1.43
3	A	1262	HEC	O1D-CGD	2.62	1.31	1.22
3	A	1262	HEC	CAD-C3D	2.58	1.56	1.52
3	B	1138	HEC	CBA-CGA	-2.58	1.43	1.50
3	B	1138	HEC	C3B-C2B	-2.54	1.36	1.41
3	A	1263	HEC	C1D-C2D	2.54	1.43	1.40
3	A	1262	HEC	C1B-NB	2.54	1.41	1.36
3	A	1262	HEC	C3B-C2B	-2.52	1.36	1.41
3	B	1138	HEC	FE-NC	2.47	2.03	1.92
3	A	1262	HEC	CBA-CGA	-2.47	1.44	1.50
3	A	1262	HEC	C3C-C2C	-2.46	1.36	1.41
3	A	1263	HEC	C3B-C2B	-2.46	1.36	1.41
3	A	1262	HEC	CBB-CAB	2.42	1.60	1.49
3	A	1263	HEC	C3C-C2C	-2.41	1.36	1.41
3	A	1262	HEC	C1A-NA	2.39	1.40	1.37
3	B	1138	HEC	FE-NA	2.35	2.02	1.92
3	A	1263	HEC	FE-NA	2.31	2.02	1.92
3	A	1262	HEC	FE-NC	2.30	2.02	1.92
3	A	1262	HEC	CAD-CBD	2.23	1.64	1.53
3	B	1138	HEC	C1B-C2B	2.19	1.42	1.40
3	B	1138	HEC	O1D-CGD	2.18	1.30	1.22
3	B	1138	HEC	O2A-CGA	-2.15	1.22	1.30
3	A	1263	HEC	C1C-NC	2.13	1.40	1.36
3	A	1262	HEC	C1C-NC	2.10	1.40	1.36
3	A	1263	HEC	C4D-ND	2.08	1.40	1.36
3	A	1263	HEC	CBD-CGD	-2.04	1.45	1.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1263	HEC	FE-NC	2.01	2.01	1.92

All (58) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1263	HEC	CBB-CAB-C3B	-7.01	108.70	128.44
3	A	1262	HEC	CBB-CAB-C3B	-5.80	112.11	128.44
3	A	1263	HEC	CMC-C2C-C3C	5.40	131.68	125.72
3	B	1138	HEC	CBB-CAB-C3B	-5.35	113.37	128.44
3	B	1138	HEC	CMC-C2C-C3C	5.21	131.47	125.72
3	A	1262	HEC	CMC-C2C-C3C	5.08	131.33	125.72
3	B	1138	HEC	CBC-CAC-C3C	-4.81	114.90	128.44
3	B	1138	HEC	C2B-C1B-NB	4.54	112.84	109.41
3	B	1138	HEC	C4B-NB-C1B	-4.36	101.02	106.76
3	A	1262	HEC	CBC-CAC-C3C	-4.17	116.70	128.44
3	A	1262	HEC	CMC-C2C-C1C	-3.93	122.58	128.62
3	A	1263	HEC	C2B-C1B-NB	3.90	112.36	109.41
3	A	1263	HEC	CMC-C2C-C1C	-3.87	122.66	128.62
3	B	1138	HEC	C2D-C1D-ND	3.87	112.33	109.41
3	A	1262	HEC	C2A-C1A-NA	3.81	112.49	109.64
3	A	1262	HEC	CMD-C2D-C1D	-3.58	123.11	128.62
3	B	1138	HEC	CMC-C2C-C1C	-3.42	123.36	128.62
3	A	1262	HEC	CBA-CAA-C2A	-3.41	105.98	112.35
3	A	1262	HEC	CMD-C2D-C3D	3.39	131.34	124.94
3	A	1263	HEC	CBC-CAC-C3C	-3.38	118.92	128.44
3	A	1263	HEC	C4B-NB-C1B	-3.34	102.37	106.76
3	A	1263	HEC	C2D-C1D-ND	3.30	111.91	109.41
3	A	1263	HEC	CMB-C2B-C3B	3.22	129.28	125.72
3	A	1262	HEC	C2B-C1B-NB	3.13	111.77	109.41
3	B	1138	HEC	CMB-C2B-C1B	-2.99	124.02	128.62
3	B	1138	HEC	C3C-C2C-C1C	-2.92	105.12	107.07
3	A	1262	HEC	CAA-CBA-CGA	2.82	122.52	113.47
3	A	1263	HEC	CMB-C2B-C1B	-2.81	124.30	128.62
3	B	1138	HEC	CMA-C3A-C2A	2.77	130.16	124.94
3	A	1263	HEC	CMD-C2D-C1D	-2.63	124.58	128.62
3	B	1138	HEC	CMD-C2D-C3D	2.56	129.78	124.94
3	A	1262	HEC	O2D-CGD-CBD	2.54	123.18	114.22
3	B	1138	HEC	CMD-C2D-C1D	-2.51	124.76	128.62
3	A	1263	HEC	O2A-CGA-CBA	2.49	123.01	114.22
3	B	1138	HEC	O2A-CGA-CBA	2.48	123.00	114.22
3	A	1262	HEC	C4B-NB-C1B	-2.48	103.49	106.76
3	B	1138	HEC	C4D-ND-C1D	-2.48	103.50	106.76

*Continued on next page...*

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1262	HEC	CAD-CBD-CGD	2.42	121.24	113.47
3	A	1263	HEC	C4D-ND-C1D	-2.41	103.59	106.76
3	A	1262	HEC	C2C-C1C-NC	2.40	111.22	109.41
3	A	1263	HEC	C1A-CHA-C4D	-2.34	124.39	127.47
3	A	1263	HEC	CMA-C3A-C2A	2.27	129.22	124.94
3	A	1263	HEC	C3C-C2C-C1C	-2.26	105.56	107.07
3	B	1138	HEC	CMB-C2B-C3B	2.26	128.22	125.72
3	B	1138	HEC	C1D-C2D-C3D	-2.20	105.46	107.00
3	A	1262	HEC	O2A-CGA-CBA	2.18	121.94	114.22
3	A	1262	HEC	C2D-C1D-ND	2.17	111.05	109.41
3	A	1262	HEC	CMA-C3A-C2A	2.16	129.01	124.94
3	A	1262	HEC	C3D-C4D-ND	2.16	112.73	109.73
3	A	1262	HEC	CBD-CAD-C3D	-2.10	108.99	112.69
3	A	1262	HEC	C4B-CHC-C1C	-2.09	124.72	127.47
3	A	1263	HEC	O2D-CGD-O1D	-2.08	118.00	123.30
3	A	1263	HEC	CMD-C2D-C3D	2.07	128.85	124.94
3	B	1138	HEC	CAA-CBA-CGA	2.07	120.12	113.47
3	A	1262	HEC	C1D-C2D-C3D	-2.07	105.56	107.00
3	B	1138	HEC	C4A-CHB-C1B	-2.07	124.75	127.47
3	A	1262	HEC	C1A-CHA-C4D	-2.02	124.81	127.47
3	B	1138	HEC	C4B-CHC-C1C	-2.00	124.83	127.47

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

## 5.7 Other polymers ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues

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	261/261 (100%)	-0.12	2 (0%) 83 90	7, 14, 26, 30	0
2	B	135/138 (97%)	0.63	12 (8%) 10 13	12, 25, 40, 46	0
All	All	396/399 (99%)	0.13	14 (3%) 42 50	7, 16, 35, 46	0

All (14) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	12	GLY	6.1
2	B	69	ALA	4.4
2	B	13	GLN	4.2
2	B	115	GLY	3.4
2	B	1	ALA	3.1
2	B	9	ALA	2.7
2	B	11	ASP	2.6
2	B	114	GLU	2.5
2	B	116	GLU	2.5
2	B	50	GLU	2.4
2	B	37	ARG	2.1
1	A	202	PHE	2.1
1	A	29	ASP	2.0
2	B	71	TYR	2.0

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

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	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
1	CSS	A	222	7/8	0.09	-0.12	9,10,17,21	0

### 6.3 Carbohydrates

There are no carbohydrates in this entry.

### 6.4 Ligands

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	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
3	HEC	A	1262	43/43	0.12	1.29	7,15,35,43	0
3	HEC	B	1138	43/43	0.12	0.33	9,15,23,29	0
3	HEC	A	1263	43/43	0.10	0.05	6,8,11,12	0

### 6.5 Other polymers

There are no such residues in this entry.