



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 15, 2024 – 07:44 PM EST

PDB ID : 1AHV
Title : STRUCTURE OF THE OCTAMERIC FLAVOENZYME VANILLYL-ALCOHOL OXIDASE IN COMPLEX WITH 2-NITRO-P-CRESOL
Authors : Mattevi, A.
Deposited on : 1997-04-10
Resolution : 3.10 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

<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>.

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

MolProbity : 4.02b-467
Mogul : 2022.3.0, CSD as543be (2022)
Xtrriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.40

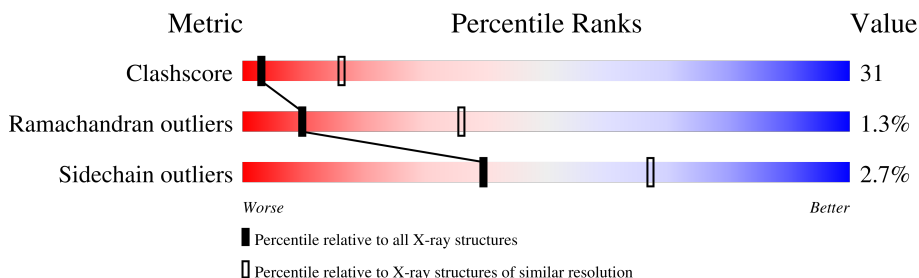
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.10 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	180529	1454 (3.10-3.10)
Ramachandran outliers	177936	1391 (3.10-3.10)
Sidechain outliers	177891	1391 (3.10-3.10)

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 ≥ 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	560	52% 44% ...
1	B	560	52% 44% ...

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	NCR	A	601	-	-	X	-
3	NCR	B	601	-	-	X	-

2 Entry composition i

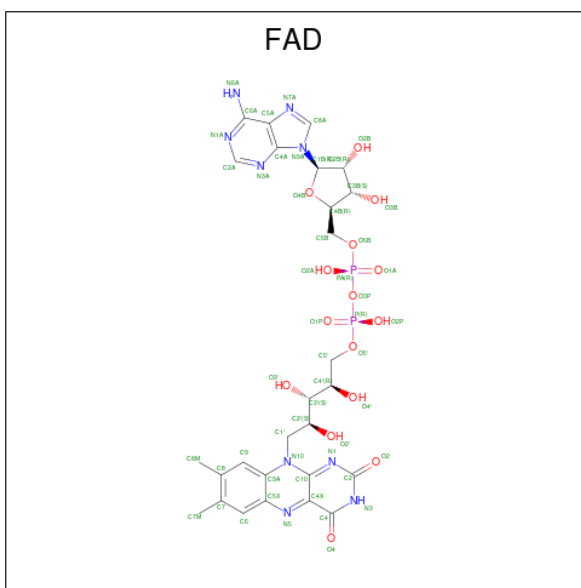
There are 3 unique types of molecules in this entry. The entry contains 8910 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 VANILLYL-ALCOHOL OXIDASE.

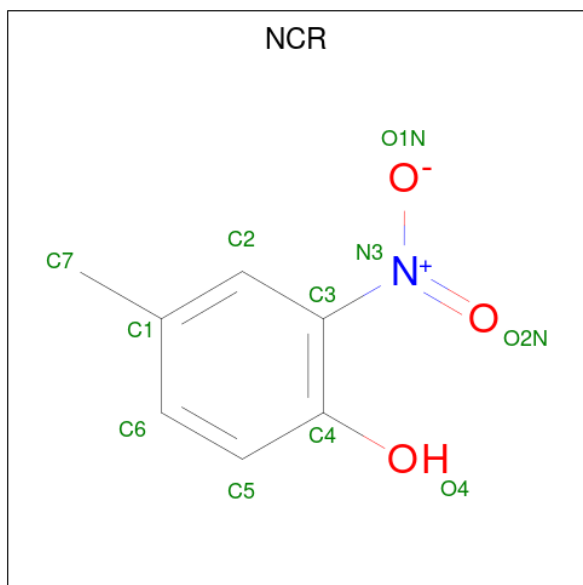
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	555	4391	2817	751	799	24	28	0	0
1	B	555	4391	2817	751	799	24	28	0	0

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	53	27	9	15	2	0	0
2	B	1	53	27	9	15	2	0	0

- Molecule 3 is 2-NITRO-P-CRESOL (three-letter code: NCR) (formula: $C_7H_7NO_3$).



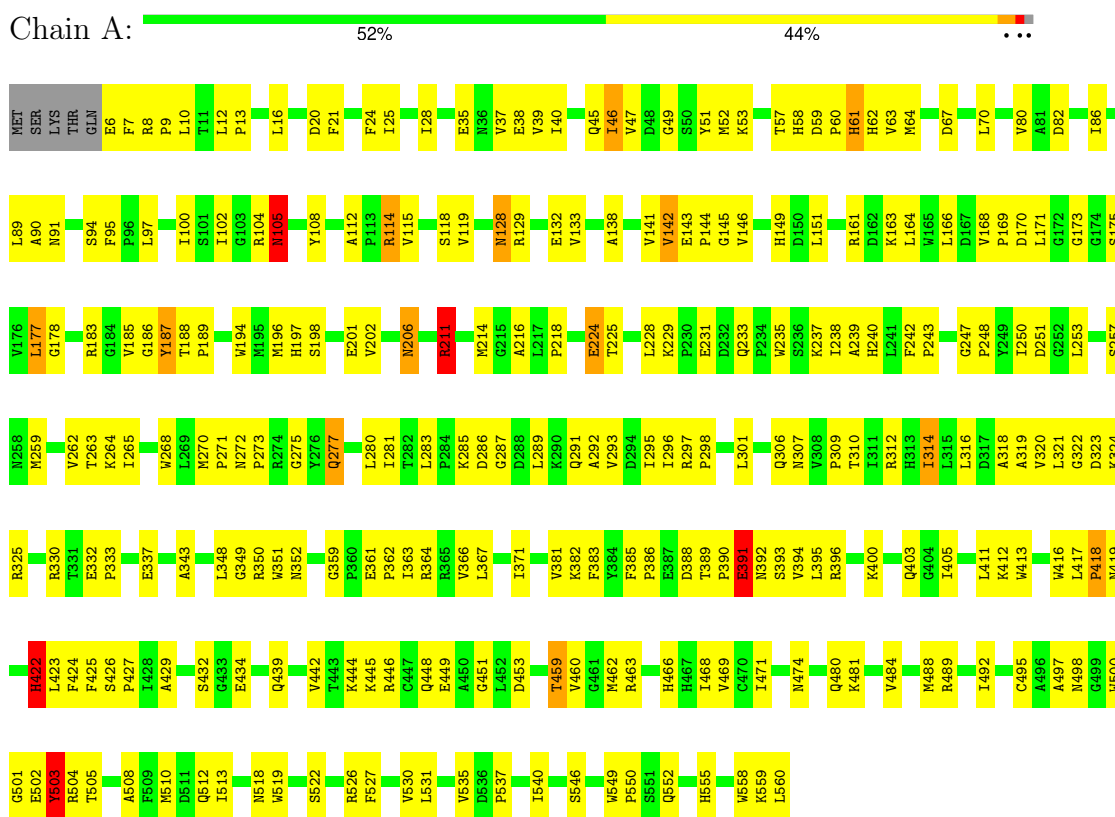
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
			Total	C	N			O
3	A	1	11	7	1	3	0	0
3	B	1	11	7	1	3	0	0

3 Residue-property plots i

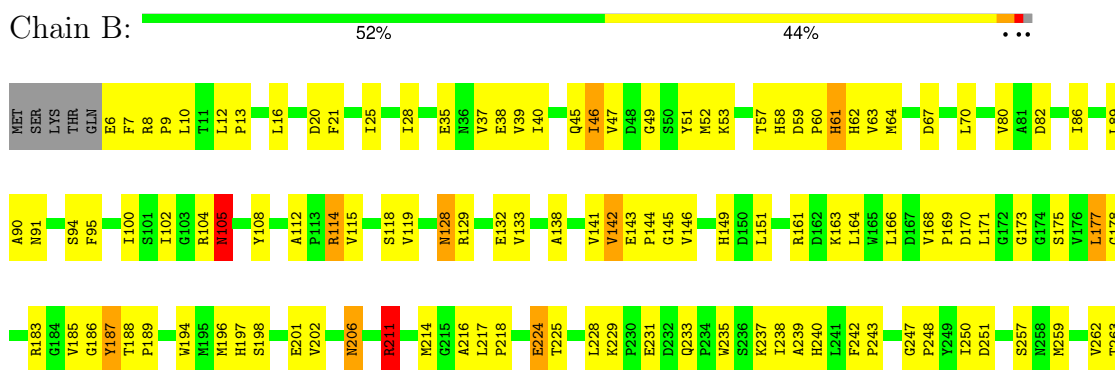
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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: VANILLYL-ALCOHOL OXIDASE



- Molecule 1: VANILLYL-ALCOHOL OXIDASE



K264	L265	W268	P271	N272	P273	R274	G275	Y276	Q277	L280	L281	T282	L283	P284	K285	D286	G287	D288	L289	K290	Q291	A292	V293	D294	I295	I296	R297	P298	L301	Q306	N307	Y308	P309	T310	I311	R312	H313	I314	L315	L316	D317	A318	A319	V320	L321	G322	D323	K324	R325	R330	I331	E332	P333
E337	A343	L348	G349	R350	W351	N352	G359	P360	E361	P362	I363	R364	R365	V366	L367	I371	V381	K382	F383	Y384	F385	P386	E387	D388	T389	P390	N392	S393	V394	L395	R396	K400	Q403	G404	I405	L411	K412	W413	W416	L417	P418	N419	R422	L423	F424	F425	S426						
P427	I428	A429	K430	V431	S432	G433	E434	Q439	V442	T443	K444	K445	R446	C447	Q448	E449	A450	G451	L452	D453	T459	V460	G461	M462	R463	E464	M465	H466	H467	I468	V469	C470	I471	M474	Q480	K481	V484	M488	R489	I492	C495	A496	A497	N498	G499	W500	G501	E502	Y503	R504			
T505	A508	F509	M510	D511	Q512	I513	N518	W519	S522	R526	F527	V530	L531	V535	D536	P537	I540	S546	W549	P550	S551	Q552	H555	W558	K559	L560																											

4 Data and refinement statistics

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

Property	Value	Source
Space group	I 4	Depositor
Cell constants a, b, c, α , β , γ	140.62Å 140.62Å 132.51Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 3.10	Depositor
% Data completeness (in resolution range)	94.3 (30.00-3.10)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.62	Depositor
Refinement program	TNT 5E	Depositor
R, R_{free}	0.205 , 0.240	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	8910	wwPDB-VP
Average B, all atoms (Å ²)	27.0	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: NCR, FAD

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	0/4511	1.02	13/6131 (0.2%)
1	B	0.33	0/4511	1.02	13/6131 (0.2%)
All	All	0.33	0/9022	1.02	26/12262 (0.2%)

There are no bond length outliers.

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	187	TYR	N-CA-C	7.66	131.68	111.00
1	B	187	TYR	N-CA-C	7.65	131.66	111.00
1	B	7	PHE	N-CA-C	7.37	130.89	111.00
1	A	7	PHE	N-CA-C	7.36	130.87	111.00
1	B	129	ARG	N-CA-C	6.96	129.79	111.00
1	A	129	ARG	N-CA-C	6.96	129.79	111.00
1	A	211	ARG	N-CA-CB	6.56	122.41	110.60
1	B	211	ARG	N-CA-CB	6.53	122.35	110.60
1	B	459	THR	N-CA-C	-5.99	94.84	111.00
1	A	459	THR	N-CA-C	-5.96	94.89	111.00
1	A	518	ASN	N-CA-C	5.60	126.13	111.00
1	B	518	ASN	N-CA-C	5.60	126.12	111.00
1	A	422	HIS	CB-CA-C	5.31	121.03	110.40
1	A	142	VAL	CB-CA-C	-5.31	101.31	111.40
1	B	422	HIS	CB-CA-C	5.31	121.02	110.40
1	B	142	VAL	CB-CA-C	-5.31	101.32	111.40
1	B	314	ILE	CB-CA-C	-5.15	101.30	111.60
1	A	314	ILE	CB-CA-C	-5.14	101.33	111.60
1	A	558	TRP	N-CA-C	5.14	124.87	111.00
1	B	173	GLY	N-CA-C	5.13	125.94	113.10
1	A	173	GLY	N-CA-C	5.12	125.90	113.10
1	B	558	TRP	N-CA-C	5.11	124.80	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	503	TYR	CB-CG-CD2	-5.05	117.97	121.00
1	B	250	ILE	N-CA-C	5.04	124.62	111.00
1	A	250	ILE	N-CA-C	5.03	124.58	111.00
1	B	503	TYR	CB-CG-CD2	-5.02	117.99	121.00

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	4391	0	4330	278	0
1	B	4391	0	4330	278	0
2	A	53	0	29	6	0
2	B	53	0	29	6	0
3	A	11	0	6	6	0
3	B	11	0	6	7	0
All	All	8910	0	8730	539	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 31.

All (539) 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:510:MET:HE1	1:A:546:SER:H	1.16	1.10
1:A:314:ILE:HD11	1:A:350:ARG:HG3	1.32	1.08
1:B:314:ILE:HD11	1:B:350:ARG:HG3	1.32	1.08
2:A:600:FAD:H8A	2:A:600:FAD:H51A	1.38	1.02
2:B:600:FAD:H51A	2:B:600:FAD:H8A	1.38	1.02
1:B:510:MET:HE1	1:B:546:SER:H	1.25	1.01
1:A:202:VAL:HG12	1:A:262:VAL:HA	1.52	0.92
1:B:202:VAL:HG12	1:B:262:VAL:HA	1.52	0.92
1:A:95:PHE:CE1	1:A:119:VAL:HG23	2.05	0.91
1:B:61:HIS:CD2	1:B:422:HIS:HD1	1.89	0.90

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:95:PHE:CE1	1:B:119:VAL:HG23	2.05	0.90
1:A:61:HIS:CD2	1:A:422:HIS:HD1	1.89	0.89
1:A:314:ILE:HD11	1:A:350:ARG:CG	2.03	0.89
1:A:505:THR:HG21	1:A:513:ILE:HD12	1.55	0.89
1:B:297:ARG:HH21	1:B:432:SER:HA	1.37	0.89
1:B:325:ARG:NH2	1:B:418:PRO:HG3	1.88	0.88
1:A:163:LYS:HE2	1:A:163:LYS:HA	1.56	0.88
1:B:314:ILE:HD11	1:B:350:ARG:CG	2.03	0.88
1:A:297:ARG:HH21	1:A:432:SER:HA	1.37	0.87
1:A:325:ARG:NH2	1:A:418:PRO:HG3	1.88	0.87
1:B:505:THR:HG21	1:B:513:ILE:HD12	1.55	0.86
1:B:163:LYS:HA	1:B:163:LYS:HE2	1.56	0.85
1:A:463:ARG:NH1	1:B:138:ALA:HB3	1.93	0.84
1:A:349:GLY:H	1:A:352:ASN:HD21	1.23	0.84
1:B:349:GLY:H	1:B:352:ASN:HD21	1.23	0.84
1:A:277:GLN:HE21	1:A:277:GLN:HA	1.43	0.83
1:B:28:ILE:HD13	1:B:89:LEU:HD12	1.61	0.83
1:A:9:PRO:HG2	1:A:12:LEU:HD21	1.61	0.83
1:A:80:VAL:HB	1:A:231:GLU:HG3	1.61	0.82
1:B:80:VAL:HB	1:B:231:GLU:HG3	1.61	0.82
1:A:9:PRO:HG2	1:A:12:LEU:CD2	2.10	0.81
1:A:61:HIS:CD2	1:A:422:HIS:H	1.97	0.81
1:A:16:LEU:HD11	1:A:20:ASP:HB2	1.61	0.81
1:B:9:PRO:HG2	1:B:12:LEU:HD21	1.60	0.81
1:B:40:ILE:HD11	1:B:57:THR:HG22	1.62	0.81
1:B:277:GLN:HE21	1:B:277:GLN:HA	1.43	0.81
1:B:61:HIS:CD2	1:B:422:HIS:H	1.97	0.81
1:B:16:LEU:HD11	1:B:20:ASP:HB2	1.60	0.81
1:B:9:PRO:HG2	1:B:12:LEU:CD2	2.10	0.81
1:A:385:PHE:HB3	1:A:386:PRO:HD2	1.62	0.80
1:A:259:MET:CE	1:A:535:VAL:HG21	2.12	0.80
1:B:259:MET:CE	1:B:535:VAL:HG21	2.12	0.80
1:B:425:PHE:CE2	1:B:427:PRO:HG3	2.16	0.80
1:A:28:ILE:HD13	1:A:89:LEU:HD12	1.61	0.80
1:A:248:PRO:HG3	1:B:257:SER:HB3	1.64	0.80
1:B:385:PHE:HB3	1:B:386:PRO:HD2	1.62	0.80
1:A:510:MET:HE1	1:A:546:SER:N	1.96	0.80
1:A:40:ILE:HD11	1:A:57:THR:HG22	1.62	0.80
1:A:463:ARG:HH12	1:B:138:ALA:HB3	1.46	0.80
1:A:16:LEU:HD11	1:A:20:ASP:CB	2.11	0.80
1:B:16:LEU:HD11	1:B:20:ASP:CB	2.11	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:425:PHE:CE2	1:A:427:PRO:HG3	2.16	0.79
1:A:359:GLY:O	1:A:364:ARG:HD3	1.84	0.78
1:B:359:GLY:O	1:B:364:ARG:HD3	1.84	0.78
1:A:312:ARG:HH21	1:A:316:LEU:HD21	1.48	0.77
1:A:257:SER:HB3	1:B:248:PRO:HG3	1.66	0.77
1:B:312:ARG:HH21	1:B:316:LEU:HD21	1.48	0.77
1:A:519:TRP:CZ3	1:B:211:ARG:HD3	2.19	0.77
1:B:510:MET:CE	1:B:546:SER:H	1.98	0.77
1:A:489:ARG:HG2	1:A:512:GLN:OE1	1.86	0.76
1:B:489:ARG:HG2	1:B:512:GLN:OE1	1.85	0.76
1:A:138:ALA:HB3	1:B:463:ARG:NH1	2.00	0.76
1:A:138:ALA:HB3	1:B:463:ARG:HH12	1.50	0.75
1:B:349:GLY:N	1:B:352:ASN:HD21	1.84	0.75
1:A:349:GLY:N	1:A:352:ASN:HD21	1.84	0.75
1:B:292:ALA:O	1:B:296:ILE:HG13	1.87	0.74
1:A:510:MET:CE	1:A:546:SER:H	1.98	0.73
1:B:105:ASN:HA	2:B:600:FAD:H5'2	1.71	0.73
1:B:526:ARG:O	1:B:530:VAL:HG23	1.89	0.73
1:A:292:ALA:O	1:A:296:ILE:HG13	1.87	0.73
1:A:503:TYR:CZ	1:A:504:ARG:HD3	2.24	0.73
1:A:105:ASN:HA	2:A:600:FAD:H5'2	1.71	0.73
1:A:519:TRP:CH2	1:B:211:ARG:HD3	2.22	0.73
1:A:161:ARG:O	1:A:161:ARG:HD3	1.89	0.73
1:A:526:ARG:O	1:A:530:VAL:HG23	1.88	0.73
1:B:161:ARG:O	1:B:161:ARG:HD3	1.89	0.73
1:B:206:ASN:H	1:B:206:ASN:HD22	1.37	0.72
1:B:503:TYR:CZ	1:B:504:ARG:HD3	2.24	0.72
1:A:28:ILE:CD1	1:A:89:LEU:HD12	2.20	0.72
1:B:40:ILE:HA	1:B:45:GLN:OE1	1.91	0.71
1:A:40:ILE:HA	1:A:45:GLN:OE1	1.91	0.71
1:B:9:PRO:HG3	1:B:21:PHE:CZ	2.25	0.71
1:A:9:PRO:HG3	1:A:21:PHE:CZ	2.25	0.71
1:A:142:VAL:HG12	1:A:143:GLU:O	1.91	0.71
1:B:28:ILE:CD1	1:B:89:LEU:HD12	2.20	0.70
1:B:142:VAL:HG12	1:B:143:GLU:O	1.91	0.70
1:A:206:ASN:HD22	1:A:206:ASN:H	1.37	0.70
1:A:310:THR:HG22	1:A:459:THR:HA	1.74	0.70
1:B:151:LEU:CD2	1:B:166:LEU:HD21	2.22	0.69
1:B:505:THR:HG21	1:B:513:ILE:CD1	2.22	0.69
1:B:206:ASN:H	1:B:206:ASN:ND2	1.90	0.69
1:A:206:ASN:H	1:A:206:ASN:ND2	1.90	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:151:LEU:CD2	1:A:166:LEU:HD21	2.22	0.69
1:B:310:THR:HG22	1:B:459:THR:HA	1.74	0.69
1:A:337:GLU:OE1	1:A:337:GLU:N	2.26	0.68
1:A:320:VAL:O	1:A:412:LYS:HE2	1.93	0.68
1:A:427:PRO:HA	1:A:501:GLY:O	1.94	0.68
1:B:427:PRO:HA	1:B:501:GLY:O	1.93	0.68
1:A:188:THR:HB	1:A:189:PRO:HD2	1.76	0.68
1:B:362:PRO:O	1:B:366:VAL:HG23	1.94	0.68
1:B:320:VAL:O	1:B:412:LYS:HE2	1.93	0.68
1:A:505:THR:HG21	1:A:513:ILE:CD1	2.23	0.67
1:A:291:GLN:O	1:A:295:ILE:HG13	1.94	0.67
1:A:362:PRO:O	1:A:366:VAL:HG23	1.94	0.67
1:B:337:GLU:OE1	1:B:337:GLU:N	2.26	0.67
1:B:489:ARG:NH2	1:B:508:ALA:O	2.28	0.67
1:B:537:PRO:O	1:B:552:GLN:NE2	2.27	0.67
1:A:489:ARG:NH2	1:A:508:ALA:O	2.28	0.67
1:A:537:PRO:O	1:A:552:GLN:NE2	2.27	0.66
1:A:389:THR:HB	1:A:390:PRO:HD2	1.78	0.66
1:B:188:THR:HB	1:B:189:PRO:HD2	1.76	0.66
1:B:389:THR:HB	1:B:390:PRO:HD2	1.78	0.66
1:B:291:GLN:O	1:B:295:ILE:HG13	1.94	0.66
1:B:349:GLY:H	1:B:352:ASN:ND2	1.94	0.66
1:A:505:THR:CG2	1:A:513:ILE:HD12	2.26	0.66
1:B:445:LYS:NZ	1:B:449:GLU:OE2	2.29	0.65
1:A:247:GLY:O	1:B:183:ARG:NH2	2.20	0.65
1:A:463:ARG:HH12	1:B:138:ALA:CB	2.10	0.65
1:B:286:ASP:HB2	1:B:350:ARG:HD3	1.78	0.65
1:A:161:ARG:NH2	1:A:403:GLN:O	2.30	0.65
1:B:161:ARG:NH2	1:B:403:GLN:O	2.30	0.65
1:A:211:ARG:HD3	1:B:519:TRP:CH2	2.32	0.64
1:A:259:MET:HE3	1:A:535:VAL:HG21	1.77	0.64
1:A:211:ARG:HD3	1:B:519:TRP:CZ3	2.33	0.64
1:B:151:LEU:HG	1:B:166:LEU:HD21	1.79	0.64
1:A:349:GLY:H	1:A:352:ASN:ND2	1.94	0.64
1:A:91:ASN:ND2	1:A:540:ILE:HG13	2.13	0.64
1:A:445:LYS:NZ	1:A:449:GLU:OE2	2.29	0.64
1:A:40:ILE:HD11	1:A:57:THR:CG2	2.28	0.63
1:A:314:ILE:CD1	1:A:350:ARG:HG3	2.20	0.63
1:B:163:LYS:O	1:B:164:LEU:HD23	1.97	0.63
1:A:151:LEU:HG	1:A:166:LEU:HD21	1.79	0.63
1:A:286:ASP:HB2	1:A:350:ARG:HD3	1.78	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:259:MET:HE3	1:B:535:VAL:HG21	1.80	0.63
1:A:163:LYS:O	1:A:164:LEU:HD23	1.97	0.63
1:B:40:ILE:HD11	1:B:57:THR:CG2	2.28	0.63
1:B:216:ALA:O	1:B:218:PRO:HD3	1.99	0.63
1:B:510:MET:HE1	1:B:546:SER:N	2.05	0.63
1:B:259:MET:HE1	1:B:535:VAL:HG21	1.81	0.63
1:B:505:THR:CG2	1:B:513:ILE:HD12	2.26	0.63
1:A:10:LEU:O	1:A:10:LEU:HD23	1.99	0.63
1:B:91:ASN:ND2	1:B:540:ILE:HG13	2.13	0.63
1:A:216:ALA:O	1:A:218:PRO:HD3	1.99	0.62
1:A:444:LYS:O	1:A:448:GLN:HG2	1.99	0.62
1:A:495:CYS:HB3	1:A:500:TRP:HB2	1.81	0.62
1:B:314:ILE:HD11	1:B:350:ARG:HA	1.81	0.62
1:B:444:LYS:O	1:B:448:GLN:HG2	1.99	0.62
1:B:277:GLN:HE21	1:B:277:GLN:CA	2.13	0.62
1:B:425:PHE:HB3	1:B:469:VAL:HB	1.82	0.62
1:B:194:TRP:O	1:B:197:HIS:HD2	1.82	0.61
1:A:194:TRP:O	1:A:197:HIS:HD2	1.82	0.61
1:B:277:GLN:HA	1:B:277:GLN:NE2	2.14	0.61
2:B:600:FAD:N5	3:B:601:NCR:H73	2.15	0.61
1:B:35:GLU:H	1:B:35:GLU:CD	2.04	0.61
1:B:102:ILE:HG12	1:B:175:SER:HB2	1.82	0.61
1:A:468:ILE:HD13	3:A:601:NCR:C3	2.30	0.61
1:B:497:ALA:C	1:B:498:ASN:HD22	2.03	0.61
1:A:61:HIS:HD2	1:A:422:HIS:HD1	1.46	0.61
1:B:10:LEU:HD23	1:B:10:LEU:O	1.99	0.61
1:A:183:ARG:NH2	1:B:247:GLY:O	2.28	0.61
1:A:425:PHE:HB3	1:A:469:VAL:HB	1.82	0.61
2:A:600:FAD:N5	3:A:601:NCR:H73	2.15	0.61
1:A:314:ILE:HD11	1:A:350:ARG:HA	1.81	0.61
1:B:468:ILE:HD13	3:B:601:NCR:C3	2.30	0.61
1:B:495:CYS:HB3	1:B:500:TRP:HB2	1.81	0.60
1:A:35:GLU:CD	1:A:35:GLU:H	2.03	0.60
1:A:105:ASN:HD21	1:A:504:ARG:HH21	1.49	0.60
1:A:102:ILE:HG12	1:A:175:SER:HB2	1.82	0.60
1:B:314:ILE:CD1	1:B:350:ARG:HA	2.31	0.60
1:A:277:GLN:HE21	1:A:277:GLN:CA	2.13	0.60
1:B:309:PRO:HD2	1:B:460:VAL:HB	1.82	0.60
1:A:58:HIS:O	1:A:60:PRO:HD3	2.02	0.60
1:A:314:ILE:CD1	1:A:350:ARG:HA	2.32	0.60
1:A:259:MET:HE1	1:A:535:VAL:HG21	1.84	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:58:HIS:O	1:B:60:PRO:HD3	2.02	0.59
1:B:229:LYS:O	1:B:233:GLN:HG3	2.02	0.59
1:A:309:PRO:HD2	1:A:460:VAL:HB	1.82	0.59
1:A:497:ALA:C	1:A:498:ASN:HD22	2.03	0.59
1:B:297:ARG:HB3	1:B:298:PRO:HD3	1.84	0.59
1:A:277:GLN:HA	1:A:277:GLN:NE2	2.14	0.59
1:A:297:ARG:HB3	1:A:298:PRO:HD3	1.84	0.59
1:B:105:ASN:HD21	1:B:504:ARG:HH21	1.50	0.59
1:A:82:ASP:O	1:A:86:ILE:HG13	2.03	0.59
1:B:12:LEU:HB3	1:B:13:PRO:HD2	1.84	0.59
1:A:363:ILE:HD12	1:B:363:ILE:HD12	1.85	0.58
1:A:224:GLU:CD	1:A:224:GLU:H	2.07	0.58
1:A:229:LYS:O	1:A:233:GLN:HG3	2.02	0.58
1:A:12:LEU:HB3	1:A:13:PRO:CD	2.33	0.58
1:B:434:GLU:OE1	1:B:434:GLU:HA	2.03	0.58
1:A:434:GLU:HA	1:A:434:GLU:OE1	2.03	0.58
1:A:325:ARG:HH21	1:A:418:PRO:HG3	1.69	0.58
1:A:351:TRP:O	1:A:352:ASN:ND2	2.36	0.58
1:A:301:LEU:HB3	1:B:271:PRO:HG3	1.85	0.58
1:B:28:ILE:HD13	1:B:89:LEU:CD1	2.33	0.58
1:B:82:ASP:O	1:B:86:ILE:HG13	2.03	0.58
1:B:224:GLU:CD	1:B:224:GLU:H	2.07	0.58
1:B:351:TRP:O	1:B:352:ASN:ND2	2.36	0.58
1:A:138:ALA:CB	1:B:463:ARG:HH12	2.15	0.57
1:A:214:MET:HB2	1:A:239:ALA:HA	1.87	0.57
1:B:35:GLU:OE1	1:B:35:GLU:N	2.29	0.57
1:B:332:GLU:HB3	1:B:333:PRO:HD2	1.87	0.57
1:B:12:LEU:HB3	1:B:13:PRO:CD	2.33	0.57
1:A:12:LEU:HB3	1:A:13:PRO:HD2	1.84	0.57
1:A:332:GLU:HB3	1:A:333:PRO:HD2	1.87	0.57
1:A:257:SER:CB	1:B:248:PRO:HG3	2.34	0.57
1:B:128:ASN:HD22	1:B:145:GLY:HA3	1.70	0.57
1:B:343:ALA:HB1	1:B:348:LEU:O	2.04	0.57
1:A:163:LYS:HA	1:A:163:LYS:CE	2.33	0.56
1:A:128:ASN:HD22	1:A:145:GLY:HA3	1.70	0.56
1:B:163:LYS:HE2	1:B:163:LYS:CA	2.34	0.56
1:A:151:LEU:CG	1:A:166:LEU:HD21	2.35	0.56
1:A:163:LYS:HE2	1:A:163:LYS:CA	2.34	0.56
1:B:61:HIS:HD2	1:B:422:HIS:HD1	1.45	0.56
1:B:151:LEU:CG	1:B:166:LEU:HD21	2.35	0.56
1:B:446:ARG:HD3	1:B:449:GLU:OE1	2.06	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:46:ILE:O	1:A:46:ILE:HG22	2.06	0.56
1:A:343:ALA:HB1	1:A:348:LEU:O	2.04	0.56
1:A:419:ASN:O	1:A:474:ASN:HA	2.06	0.56
1:B:16:LEU:CD1	1:B:20:ASP:HB2	2.34	0.56
1:B:214:MET:HB2	1:B:239:ALA:HA	1.86	0.56
1:A:446:ARG:HD3	1:A:449:GLU:OE1	2.06	0.56
1:A:35:GLU:OE1	1:A:35:GLU:N	2.29	0.56
1:A:248:PRO:HG3	1:B:257:SER:CB	2.35	0.56
1:B:46:ILE:HG22	1:B:46:ILE:O	2.06	0.56
1:B:177:LEU:HD12	1:B:177:LEU:C	2.27	0.56
1:B:314:ILE:CD1	1:B:350:ARG:HG3	2.20	0.55
1:B:419:ASN:O	1:B:474:ASN:HA	2.06	0.55
1:A:318:ALA:O	1:A:322:GLY:N	2.38	0.55
1:A:555:HIS:CD2	1:A:559:LYS:HE3	2.41	0.55
1:B:142:VAL:HG13	1:B:146:VAL:CG2	2.37	0.55
1:B:325:ARG:HH21	1:B:418:PRO:HG3	1.69	0.55
1:B:555:HIS:CD2	1:B:559:LYS:HE3	2.41	0.55
1:A:37:VAL:HG12	1:A:38:GLU:N	2.21	0.55
1:A:94:SER:HA	1:A:540:ILE:HD11	1.88	0.55
1:B:555:HIS:HB3	1:B:559:LYS:HE3	1.88	0.55
1:A:555:HIS:HB3	1:A:559:LYS:HE3	1.88	0.55
1:A:16:LEU:CD1	1:A:20:ASP:HB2	2.34	0.55
1:A:142:VAL:HG13	1:A:146:VAL:CG2	2.37	0.55
1:A:177:LEU:C	1:A:177:LEU:HD12	2.26	0.55
1:A:312:ARG:HH11	1:A:394:VAL:HG11	1.72	0.55
1:B:312:ARG:HH11	1:B:394:VAL:HG11	1.72	0.55
1:B:37:VAL:HG12	1:B:38:GLU:N	2.21	0.55
1:A:286:ASP:CA	1:A:350:ARG:HD3	2.37	0.55
1:A:391:GLU:HA	1:A:396:ARG:HD2	1.89	0.55
1:A:552:GLN:OE1	1:A:552:GLN:N	2.27	0.55
1:B:163:LYS:HA	1:B:163:LYS:CE	2.34	0.55
1:A:459:THR:OG1	1:A:466:HIS:HB2	2.07	0.55
1:B:471:ILE:HD12	1:B:471:ILE:N	2.22	0.55
1:B:552:GLN:OE1	1:B:552:GLN:N	2.27	0.55
1:B:142:VAL:HG13	1:B:146:VAL:HG21	1.89	0.54
1:A:285:LYS:HG2	1:A:287:GLY:H	1.72	0.54
1:B:286:ASP:HB2	1:B:350:ARG:CZ	2.37	0.54
1:B:286:ASP:CA	1:B:350:ARG:HD3	2.37	0.54
1:B:318:ALA:O	1:B:322:GLY:N	2.38	0.54
1:B:459:THR:OG1	1:B:466:HIS:HB2	2.07	0.54
1:A:28:ILE:HD13	1:A:89:LEU:CD1	2.33	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:314:ILE:HG12	1:A:350:ARG:HA	1.90	0.54
1:A:286:ASP:HB2	1:A:350:ARG:CZ	2.37	0.54
1:B:94:SER:HA	1:B:540:ILE:HD11	1.88	0.54
1:A:471:ILE:N	1:A:471:ILE:HD12	2.22	0.54
1:B:281:ILE:HG23	1:B:381:VAL:CG2	2.38	0.54
1:B:314:ILE:HG12	1:B:350:ARG:HA	1.90	0.54
1:B:391:GLU:HA	1:B:396:ARG:HD2	1.89	0.54
1:B:188:THR:HB	1:B:189:PRO:CD	2.38	0.54
1:A:142:VAL:HG13	1:A:146:VAL:HG21	1.89	0.53
1:A:418:PRO:HB2	1:A:474:ASN:ND2	2.23	0.53
1:B:413:TRP:CZ2	2:B:600:FAD:HM72	2.43	0.53
1:A:16:LEU:HD11	1:A:20:ASP:HB3	1.91	0.53
1:A:271:PRO:HG3	1:B:301:LEU:HB3	1.89	0.53
1:A:281:ILE:HG23	1:A:381:VAL:CG2	2.38	0.53
1:B:8:ARG:O	1:B:8:ARG:HG3	2.08	0.53
1:B:286:ASP:N	1:B:350:ARG:HD3	2.24	0.53
1:B:361:GLU:HB3	1:B:362:PRO:HD3	1.91	0.53
1:B:418:PRO:HB2	1:B:474:ASN:ND2	2.23	0.53
1:A:102:ILE:HB	2:A:600:FAD:O2P	2.08	0.53
1:A:361:GLU:HB3	1:A:362:PRO:HD3	1.91	0.53
1:A:413:TRP:CZ2	2:A:600:FAD:HM72	2.43	0.53
1:B:504:ARG:O	1:B:505:THR:HG23	2.08	0.53
1:A:63:VAL:HG23	1:A:64:MET:N	2.23	0.53
1:A:286:ASP:N	1:A:350:ARG:HD3	2.24	0.53
1:A:188:THR:HB	1:A:189:PRO:CD	2.38	0.53
1:B:63:VAL:HG23	1:B:64:MET:N	2.23	0.53
1:B:285:LYS:HG2	1:B:287:GLY:H	1.72	0.53
1:A:177:LEU:HD12	1:A:178:GLY:N	2.24	0.52
1:A:498:ASN:O	1:B:237:LYS:HE2	2.08	0.52
1:B:367:LEU:O	1:B:371:ILE:HG13	2.09	0.52
1:B:102:ILE:HB	2:B:600:FAD:O2P	2.09	0.52
1:A:504:ARG:O	1:A:505:THR:HG23	2.08	0.52
1:B:171:LEU:HD11	1:B:411:LEU:HD23	1.92	0.52
1:B:51:TYR:O	1:B:104:ARG:HD3	2.10	0.52
1:B:312:ARG:HH21	1:B:316:LEU:CD2	2.22	0.52
1:A:51:TYR:O	1:A:104:ARG:HD3	2.10	0.52
1:A:225:THR:O	1:A:228:LEU:HD13	2.10	0.52
1:B:225:THR:O	1:B:228:LEU:HD13	2.10	0.52
1:A:171:LEU:HD11	1:A:411:LEU:HD23	1.92	0.52
1:A:312:ARG:HH21	1:A:316:LEU:CD2	2.22	0.51
1:B:197:HIS:HE1	1:B:251:ASP:OD2	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:52:MET:C	1:B:53:LYS:HG3	2.29	0.51
1:B:177:LEU:HD12	1:B:178:GLY:N	2.25	0.51
1:B:314:ILE:CG1	1:B:350:ARG:HA	2.40	0.51
1:A:185:VAL:HG12	1:A:186:GLY:N	2.25	0.51
1:A:52:MET:C	1:A:53:LYS:HG3	2.29	0.51
1:B:185:VAL:HG12	1:B:186:GLY:N	2.25	0.51
1:A:197:HIS:HE1	1:A:251:ASP:OD2	1.94	0.51
1:B:489:ARG:HH22	1:B:560:LEU:HD22	1.76	0.51
1:A:8:ARG:O	1:A:8:ARG:HG3	2.08	0.51
1:B:281:ILE:HG12	1:B:383:PHE:CD1	2.46	0.51
1:A:445:LYS:HZ2	1:A:449:GLU:CD	2.14	0.51
1:A:314:ILE:CG1	1:A:350:ARG:HA	2.40	0.51
1:A:489:ARG:HH22	1:A:560:LEU:HD22	1.76	0.51
1:B:100:ILE:O	1:B:100:ILE:HG13	2.10	0.51
1:A:281:ILE:HG12	1:A:383:PHE:CD1	2.46	0.50
1:A:202:VAL:HG12	1:A:262:VAL:CA	2.35	0.50
1:A:367:LEU:O	1:A:371:ILE:HG13	2.09	0.50
1:B:67:ASP:O	1:B:70:LEU:HD22	2.11	0.50
1:B:144:PRO:HD3	1:B:263:THR:O	2.11	0.50
1:A:67:ASP:O	1:A:70:LEU:HD22	2.11	0.50
1:B:297:ARG:HH21	1:B:432:SER:CA	2.19	0.50
1:B:301:LEU:HD23	1:B:462:MET:HE3	1.92	0.50
1:B:201:GLU:OE2	1:B:264:LYS:HE2	2.12	0.50
1:B:400:LYS:HB3	1:B:405:ILE:HB	1.92	0.50
1:A:128:ASN:HA	1:A:145:GLY:HA3	1.94	0.50
1:A:144:PRO:HD3	1:A:263:THR:O	2.11	0.50
1:A:400:LYS:HB3	1:A:405:ILE:HB	1.92	0.50
1:B:21:PHE:CZ	1:B:25:ILE:HG13	2.47	0.50
1:A:286:ASP:CB	1:A:350:ARG:HD3	2.42	0.50
1:A:390:PRO:HB2	1:A:392:ASN:OD1	2.11	0.50
1:A:185:VAL:HB	3:A:601:NCR:O1N	2.12	0.50
1:A:527:PHE:CE2	1:A:531:LEU:HD11	2.47	0.50
1:B:527:PHE:CE2	1:B:531:LEU:HD11	2.47	0.50
1:B:16:LEU:HD11	1:B:20:ASP:HB3	1.91	0.50
1:B:108:TYR:OH	3:B:601:NCR:H5	2.12	0.50
1:A:100:ILE:HG13	1:A:100:ILE:O	2.10	0.50
1:A:289:LEU:HD22	1:A:351:TRP:CZ2	2.46	0.50
1:A:488:MET:O	1:A:492:ILE:HG13	2.12	0.50
1:B:63:VAL:HG23	1:B:64:MET:HG3	1.94	0.50
1:B:289:LEU:HD22	1:B:351:TRP:CZ2	2.46	0.50
1:A:6:GLU:CB	1:A:39:VAL:HG21	2.42	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:519:TRP:CH2	1:B:211:ARG:CD	2.92	0.49
1:B:488:MET:O	1:B:492:ILE:HG13	2.12	0.49
1:B:128:ASN:HA	1:B:145:GLY:HA3	1.94	0.49
1:A:187:TYR:O	1:A:307:ASN:HB2	2.13	0.49
1:B:6:GLU:CB	1:B:39:VAL:HG21	2.42	0.49
1:B:185:VAL:HB	3:B:601:NCR:O1N	2.12	0.49
1:A:108:TYR:OH	3:A:601:NCR:H5	2.12	0.49
1:B:390:PRO:HB2	1:B:392:ASN:OD1	2.12	0.49
1:A:21:PHE:CZ	1:A:25:ILE:HG13	2.47	0.49
1:A:201:GLU:OE2	1:A:264:LYS:HE2	2.12	0.49
1:A:416:TRP:CD1	1:A:417:LEU:CD1	2.96	0.49
1:A:63:VAL:HG23	1:A:64:MET:HG3	1.94	0.49
1:A:238:ILE:O	1:A:238:ILE:HG22	2.13	0.49
1:B:238:ILE:HG22	1:B:238:ILE:O	2.13	0.49
1:B:187:TYR:O	1:B:307:ASN:HB2	2.13	0.48
1:A:416:TRP:HD1	1:A:417:LEU:CD1	2.26	0.48
1:B:211:ARG:HG2	1:B:235:TRP:CH2	2.49	0.48
1:B:416:TRP:CD1	1:B:417:LEU:CD1	2.96	0.48
1:B:289:LEU:O	1:B:293:VAL:HG23	2.13	0.48
1:B:286:ASP:CB	1:B:350:ARG:HD3	2.42	0.48
1:B:416:TRP:HD1	1:B:417:LEU:CD1	2.26	0.48
1:A:90:ALA:O	1:A:94:SER:N	2.47	0.48
1:A:289:LEU:O	1:A:293:VAL:HG23	2.14	0.48
1:A:417:LEU:HB3	1:A:418:PRO:HD2	1.96	0.48
1:A:280:LEU:HB2	1:A:395:LEU:HD22	1.96	0.48
1:A:196:MET:HE3	1:A:268:TRP:HE3	1.78	0.48
1:B:417:LEU:HB3	1:B:418:PRO:HD2	1.96	0.48
1:B:468:ILE:CD1	3:B:601:NCR:C3	2.92	0.48
2:A:600:FAD:H51A	2:A:600:FAD:C8A	2.28	0.47
1:A:91:ASN:HD22	1:A:540:ILE:HG13	1.79	0.47
1:B:286:ASP:HB2	1:B:350:ARG:CD	2.43	0.47
1:A:211:ARG:HG2	1:A:235:TRP:CH2	2.48	0.47
1:A:468:ILE:CD1	3:A:601:NCR:C3	2.92	0.47
1:B:132:GLU:HG2	1:B:133:VAL:N	2.30	0.47
1:A:177:LEU:CB	1:A:265:ILE:HG21	2.44	0.47
1:A:312:ARG:NH1	1:A:394:VAL:HG11	2.30	0.47
1:B:445:LYS:HZ2	1:B:449:GLU:CD	2.18	0.47
1:A:115:VAL:HG13	1:A:118:SER:OG	2.15	0.47
1:A:297:ARG:N	1:A:298:PRO:HD2	2.29	0.47
1:A:312:ARG:NH2	1:A:316:LEU:HD21	2.24	0.47
1:A:333:PRO:HA	1:A:453:ASP:OD1	2.15	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:275:GLY:HA3	1:B:359:GLY:O	2.15	0.47
1:B:177:LEU:CB	1:B:265:ILE:HG21	2.44	0.47
1:B:333:PRO:HA	1:B:453:ASP:OD1	2.15	0.47
1:A:285:LYS:HG2	1:A:286:ASP:N	2.30	0.47
1:B:91:ASN:HD22	1:B:540:ILE:HG13	1.79	0.47
1:A:301:LEU:HD23	1:A:462:MET:HE3	1.97	0.46
1:A:439:GLN:O	1:A:442:VAL:HG12	2.16	0.46
1:B:9:PRO:HG2	1:B:12:LEU:HD23	1.94	0.46
1:A:9:PRO:CG	1:A:12:LEU:HD21	2.41	0.46
1:B:429:ALA:HB2	1:B:439:GLN:NE2	2.30	0.46
1:B:297:ARG:N	1:B:298:PRO:HD2	2.29	0.46
1:B:306:GLN:NE2	1:B:367:LEU:CD1	2.79	0.46
1:B:439:GLN:O	1:B:442:VAL:HG12	2.15	0.46
1:A:306:GLN:NE2	1:A:367:LEU:CD1	2.79	0.46
1:A:429:ALA:HB2	1:A:439:GLN:NE2	2.30	0.46
1:B:225:THR:C	1:B:228:LEU:HD13	2.36	0.46
1:A:132:GLU:HG2	1:A:133:VAL:N	2.30	0.46
1:B:312:ARG:NH1	1:B:394:VAL:HG11	2.30	0.46
1:B:115:VAL:HG13	1:B:118:SER:OG	2.15	0.46
1:B:189:PRO:HD3	1:B:307:ASN:HB3	1.98	0.46
1:A:469:VAL:HG12	1:A:471:ILE:HD12	1.98	0.46
1:A:550:PRO:HB2	1:A:552:GLN:OE1	2.16	0.46
1:A:286:ASP:HB2	1:A:350:ARG:CD	2.43	0.46
1:A:225:THR:C	1:A:228:LEU:HD13	2.36	0.46
1:A:333:PRO:HD3	1:A:451:GLY:O	2.16	0.46
1:A:9:PRO:HG2	1:A:12:LEU:HD23	1.94	0.45
1:A:189:PRO:HD3	1:A:307:ASN:HB3	1.97	0.45
1:A:231:GLU:OE1	1:A:231:GLU:N	2.37	0.45
1:B:333:PRO:HD3	1:B:451:GLY:O	2.16	0.45
1:B:90:ALA:O	1:B:94:SER:N	2.47	0.45
1:B:280:LEU:HB2	1:B:395:LEU:HD22	1.96	0.45
1:A:275:GLY:HA3	1:A:359:GLY:O	2.15	0.45
1:B:550:PRO:HB2	1:B:552:GLN:OE1	2.16	0.45
1:A:185:VAL:CG1	1:A:186:GLY:N	2.79	0.45
1:B:63:VAL:CG2	1:B:64:MET:N	2.79	0.45
1:B:312:ARG:NH2	1:B:316:LEU:HD21	2.24	0.45
1:A:198:SER:O	1:A:240:HIS:HD2	2.00	0.45
1:B:198:SER:O	1:B:240:HIS:HD2	2.00	0.45
1:B:285:LYS:HG2	1:B:286:ASP:N	2.30	0.45
1:B:185:VAL:CG1	1:B:186:GLY:N	2.79	0.45
1:A:61:HIS:CD2	1:A:422:HIS:N	2.77	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:321:LEU:HD23	1:A:321:LEU:HA	1.77	0.45
1:B:423:LEU:HD21	1:B:488:MET:HG3	1.98	0.45
1:A:503:TYR:OH	1:A:504:ARG:HD3	2.17	0.45
1:B:142:VAL:HG12	1:B:143:GLU:N	2.32	0.45
1:A:9:PRO:HG3	1:A:21:PHE:CE1	2.51	0.45
1:A:312:ARG:NH2	1:A:316:LEU:CD2	2.80	0.45
1:A:206:ASN:HD22	1:A:206:ASN:N	2.10	0.44
1:B:9:PRO:HG3	1:B:21:PHE:CE1	2.51	0.44
1:B:231:GLU:OE1	1:B:231:GLU:N	2.37	0.44
1:B:47:VAL:HG23	1:B:47:VAL:O	2.18	0.44
1:A:47:VAL:O	1:A:47:VAL:HG23	2.18	0.44
1:B:312:ARG:NH2	1:B:316:LEU:CD2	2.80	0.44
1:B:59:ASP:OD2	1:B:62:HIS:HA	2.17	0.44
1:A:61:HIS:CD2	1:A:422:HIS:ND1	2.73	0.44
1:A:102:ILE:HD13	1:A:102:ILE:HA	1.84	0.44
1:A:283:LEU:HD13	1:A:292:ALA:HB2	1.98	0.44
1:A:423:LEU:HD21	1:A:488:MET:HG3	1.98	0.44
1:B:177:LEU:HB2	1:B:265:ILE:HG21	1.99	0.44
1:A:59:ASP:OD2	1:A:62:HIS:HA	2.17	0.44
1:A:63:VAL:CG2	1:A:64:MET:N	2.80	0.44
1:B:283:LEU:HD13	1:B:292:ALA:HB2	1.98	0.44
1:B:480:GLN:O	1:B:484:VAL:HG23	2.17	0.44
1:B:277:GLN:OE1	1:B:385:PHE:HD2	2.01	0.44
1:B:469:VAL:HG12	1:B:471:ILE:HD12	1.98	0.44
2:B:600:FAD:H51A	2:B:600:FAD:C8A	2.28	0.44
1:B:503:TYR:OH	1:B:504:ARG:HD3	2.17	0.44
1:A:142:VAL:HG12	1:A:143:GLU:N	2.32	0.43
1:A:552:GLN:H	1:A:552:GLN:CD	2.17	0.43
1:A:63:VAL:O	1:A:481:LYS:HD3	2.18	0.43
1:B:8:ARG:HA	1:B:9:PRO:HD3	1.75	0.43
1:B:58:HIS:HA	1:B:112:ALA:HB2	1.99	0.43
1:A:58:HIS:HA	1:A:112:ALA:HB2	1.99	0.43
1:B:9:PRO:CG	1:B:12:LEU:HD21	2.41	0.43
1:A:177:LEU:HB2	1:A:265:ILE:HG21	1.99	0.43
1:A:480:GLN:O	1:A:484:VAL:HG23	2.17	0.43
1:B:552:GLN:H	1:B:552:GLN:CD	2.17	0.43
1:A:253:LEU:O	1:A:257:SER:OG	2.30	0.43
1:A:349:GLY:CA	1:A:352:ASN:HD21	2.31	0.43
1:A:555:HIS:HD2	1:A:559:LYS:HE3	1.83	0.43
1:A:141:VAL:C	1:A:142:VAL:HG23	2.39	0.43
1:B:63:VAL:HG11	1:B:423:LEU:HD22	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:555:HIS:HD2	1:B:559:LYS:HE3	1.83	0.43
1:A:277:GLN:OE1	1:A:385:PHE:HD2	2.01	0.43
1:B:522:SER:O	1:B:526:ARG:HG2	2.19	0.43
1:B:503:TYR:CZ	1:B:504:ARG:CD	2.99	0.43
1:A:426:SER:O	1:A:502:GLU:HA	2.19	0.43
1:B:63:VAL:O	1:B:481:LYS:HD3	2.18	0.43
1:A:142:VAL:CG1	1:A:143:GLU:N	2.82	0.42
1:B:426:SER:O	1:B:502:GLU:HA	2.19	0.42
1:A:382:LYS:HB3	1:A:382:LYS:HE3	1.85	0.42
1:A:114:ARG:NH1	1:A:549:TRP:HZ2	2.18	0.42
1:A:237:LYS:HE2	1:B:498:ASN:O	2.19	0.42
1:A:503:TYR:CZ	1:A:504:ARG:CD	2.99	0.42
1:B:61:HIS:CD2	1:B:422:HIS:N	2.77	0.42
1:A:40:ILE:CD1	1:A:57:THR:CG2	2.98	0.42
1:A:142:VAL:CG1	1:A:146:VAL:HB	2.49	0.42
1:B:202:VAL:HG12	1:B:262:VAL:CA	2.34	0.42
1:A:323:ASP:OD1	1:A:324:LYS:N	2.53	0.42
1:B:323:ASP:OD1	1:B:324:LYS:N	2.53	0.42
1:B:142:VAL:CG1	1:B:146:VAL:HB	2.49	0.42
1:A:281:ILE:HG12	1:A:383:PHE:HD1	1.84	0.42
1:A:522:SER:O	1:A:526:ARG:HG2	2.19	0.42
1:A:97:LEU:HD23	1:A:97:LEU:HA	1.78	0.42
1:B:393:SER:OG	1:B:396:ARG:HG3	2.19	0.42
1:A:285:LYS:CG	1:A:286:ASP:N	2.83	0.42
1:A:393:SER:OG	1:A:396:ARG:HG3	2.19	0.42
1:B:349:GLY:CA	1:B:352:ASN:HD21	2.31	0.42
1:A:63:VAL:HG11	1:A:423:LEU:HD22	2.01	0.41
1:A:319:ALA:HB3	1:A:413:TRP:HB2	2.02	0.41
1:B:61:HIS:CD2	1:B:422:HIS:ND1	2.73	0.41
1:B:319:ALA:HB3	1:B:413:TRP:HB2	2.02	0.41
1:A:242:PHE:HA	1:A:243:PRO:HD3	1.65	0.41
1:B:141:VAL:C	1:B:142:VAL:HG23	2.39	0.41
1:B:503:TYR:OH	3:B:601:NCR:O4	2.24	0.41
1:A:425:PHE:CE2	1:A:427:PRO:CG	2.97	0.41
1:B:418:PRO:HB2	1:B:474:ASN:HD22	1.86	0.41
1:A:324:LYS:HB2	1:A:416:TRP:CE2	2.56	0.41
1:B:324:LYS:HB2	1:B:416:TRP:CE2	2.56	0.41
1:A:330:ARG:HG2	1:A:332:GLU:H	1.85	0.41
1:B:177:LEU:HD23	1:B:265:ILE:HG22	2.02	0.41
1:B:206:ASN:HD22	1:B:206:ASN:N	2.10	0.41
1:B:168:VAL:HB	1:B:169:PRO:HD2	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:196:MET:HE3	1:B:268:TRP:HE3	1.85	0.41
1:B:201:GLU:HG2	1:B:263:THR:OG1	2.21	0.41
1:B:319:ALA:CB	1:B:413:TRP:HB2	2.51	0.41
1:A:416:TRP:CD1	1:A:417:LEU:HD12	2.55	0.41
1:B:171:LEU:CD1	1:B:411:LEU:CD2	2.99	0.41
1:A:168:VAL:HB	1:A:169:PRO:HD2	2.03	0.41
1:A:201:GLU:CD	1:A:264:LYS:HE2	2.41	0.41
1:A:297:ARG:HH21	1:A:432:SER:CA	2.19	0.41
1:A:319:ALA:CB	1:A:413:TRP:HB2	2.51	0.41
1:A:424:PHE:CZ	3:A:601:NCR:H6	2.56	0.41
1:B:40:ILE:CD1	1:B:57:THR:CG2	2.98	0.41
1:B:114:ARG:NH1	1:B:549:TRP:HZ2	2.18	0.41
1:B:281:ILE:HG12	1:B:383:PHE:HD1	1.84	0.41
1:B:297:ARG:HA	1:B:431:VAL:HG11	2.03	0.41
1:B:321:LEU:HD23	1:B:321:LEU:HA	1.77	0.41
1:B:416:TRP:CD1	1:B:417:LEU:HD12	2.55	0.41
1:B:428:ILE:HG22	1:B:429:ALA:N	2.36	0.41
1:A:177:LEU:HD23	1:A:265:ILE:HG22	2.02	0.41
1:B:272:ASN:OD1	1:B:273:PRO:HD2	2.20	0.41
1:A:206:ASN:ND2	1:A:206:ASN:N	2.62	0.40
1:B:217:LEU:HD12	1:B:217:LEU:HA	1.69	0.40
1:B:285:LYS:CG	1:B:286:ASP:N	2.83	0.40
1:A:24:PHE:HE2	1:A:119:VAL:HG21	1.86	0.40
1:A:201:GLU:HG2	1:A:263:THR:OG1	2.21	0.40
1:A:270:MET:HA	1:A:271:PRO:HD2	1.77	0.40
1:A:272:ASN:OD1	1:A:273:PRO:HD2	2.20	0.40
1:B:201:GLU:CD	1:B:264:LYS:HE2	2.41	0.40
1:B:284:PRO:HG2	1:B:288:ASP:OD2	2.22	0.40
1:A:171:LEU:HD13	1:A:411:LEU:HD21	2.03	0.40
1:A:171:LEU:CD1	1:A:411:LEU:CD2	2.99	0.40
1:A:242:PHE:HB2	1:B:464:GLU:HG2	2.03	0.40
1:B:297:ARG:N	1:B:298:PRO:CD	2.85	0.40
1:B:424:PHE:CZ	3:B:601:NCR:H6	2.56	0.40
1:B:171:LEU:HD13	1:B:411:LEU:HD21	2.03	0.40
1:B:242:PHE:HA	1:B:243:PRO:HD3	1.65	0.40
1:B:330:ARG:HG2	1:B:332:GLU:H	1.85	0.40
1:B:142:VAL:CG1	1:B:143:GLU:N	2.82	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	553/560 (99%)	510 (92%)	36 (6%)	7 (1%)	10	36
1	B	553/560 (99%)	509 (92%)	37 (7%)	7 (1%)	10	36
All	All	1106/1120 (99%)	1019 (92%)	73 (7%)	14 (1%)	10	36

All (14) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	46	ILE
1	A	49	GLY
1	A	170	ASP
1	A	418	PRO
1	B	49	GLY
1	B	170	ASP
1	B	418	PRO
1	A	391	GLU
1	B	46	ILE
1	B	391	GLU
1	A	388	ASP
1	B	388	ASP
1	A	105	ASN
1	B	105	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	475/482 (98%)	462 (97%)	13 (3%)	40	67
1	B	475/482 (98%)	462 (97%)	13 (3%)	40	67
All	All	950/964 (98%)	924 (97%)	26 (3%)	40	67

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	61	HIS
1	A	105	ASN
1	A	114	ARG
1	A	128	ASN
1	A	149	HIS
1	A	177	LEU
1	A	206	ASN
1	A	211	ARG
1	A	224	GLU
1	A	277	GLN
1	A	391	GLU
1	A	422	HIS
1	A	503	TYR
1	B	61	HIS
1	B	105	ASN
1	B	114	ARG
1	B	128	ASN
1	B	149	HIS
1	B	177	LEU
1	B	206	ASN
1	B	211	ARG
1	B	224	GLU
1	B	277	GLN
1	B	391	GLU
1	B	422	HIS
1	B	503	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (30) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	61	HIS
1	A	84	GLN
1	A	91	ASN
1	A	105	ASN

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Mol	Chain	Res	Type
1	A	128	ASN
1	A	152	HIS
1	A	197	HIS
1	A	206	ASN
1	A	240	HIS
1	A	277	GLN
1	A	306	GLN
1	A	352	ASN
1	A	485	GLN
1	A	498	ASN
1	A	520	ASN
1	B	61	HIS
1	B	84	GLN
1	B	91	ASN
1	B	105	ASN
1	B	128	ASN
1	B	152	HIS
1	B	197	HIS
1	B	206	ASN
1	B	240	HIS
1	B	277	GLN
1	B	306	GLN
1	B	352	ASN
1	B	485	GLN
1	B	498	ASN
1	B	520	ASN

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 oligosaccharides in this entry.

5.6 Ligand geometry

4 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	NCR	B	601	-	11,11,11	0.76	0	11,15,15	1.23	0
2	FAD	A	600	1	54,58,58	1.01	4 (7%)	71,89,89	0.89	1 (1%)
3	NCR	A	601	-	11,11,11	0.77	0	11,15,15	1.22	0
2	FAD	B	600	1	54,58,58	1.01	4 (7%)	71,89,89	0.89	1 (1%)

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	NCR	B	601	-	-	0/2/4/4	0/1/1/1
2	FAD	A	600	1	-	6/30/50/50	0/6/6/6
3	NCR	A	601	-	-	0/2/4/4	0/1/1/1
2	FAD	B	600	1	-	6/30/50/50	0/6/6/6

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	600	FAD	P-O3P	3.23	1.63	1.59
2	A	600	FAD	P-O3P	3.19	1.62	1.59
2	A	600	FAD	PA-O3P	3.00	1.62	1.59
2	B	600	FAD	PA-O3P	2.98	1.62	1.59
2	B	600	FAD	C5X-N5	-2.34	1.35	1.39
2	A	600	FAD	C5X-N5	-2.32	1.35	1.39
2	A	600	FAD	C9A-N10	-2.30	1.37	1.41
2	B	600	FAD	C9A-N10	-2.28	1.37	1.41

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	600	FAD	C4-N3-C2	-2.32	121.52	125.64
2	A	600	FAD	C4-N3-C2	-2.31	121.54	125.64

There are no chirality outliers.

All (12) torsion outliers are listed below:

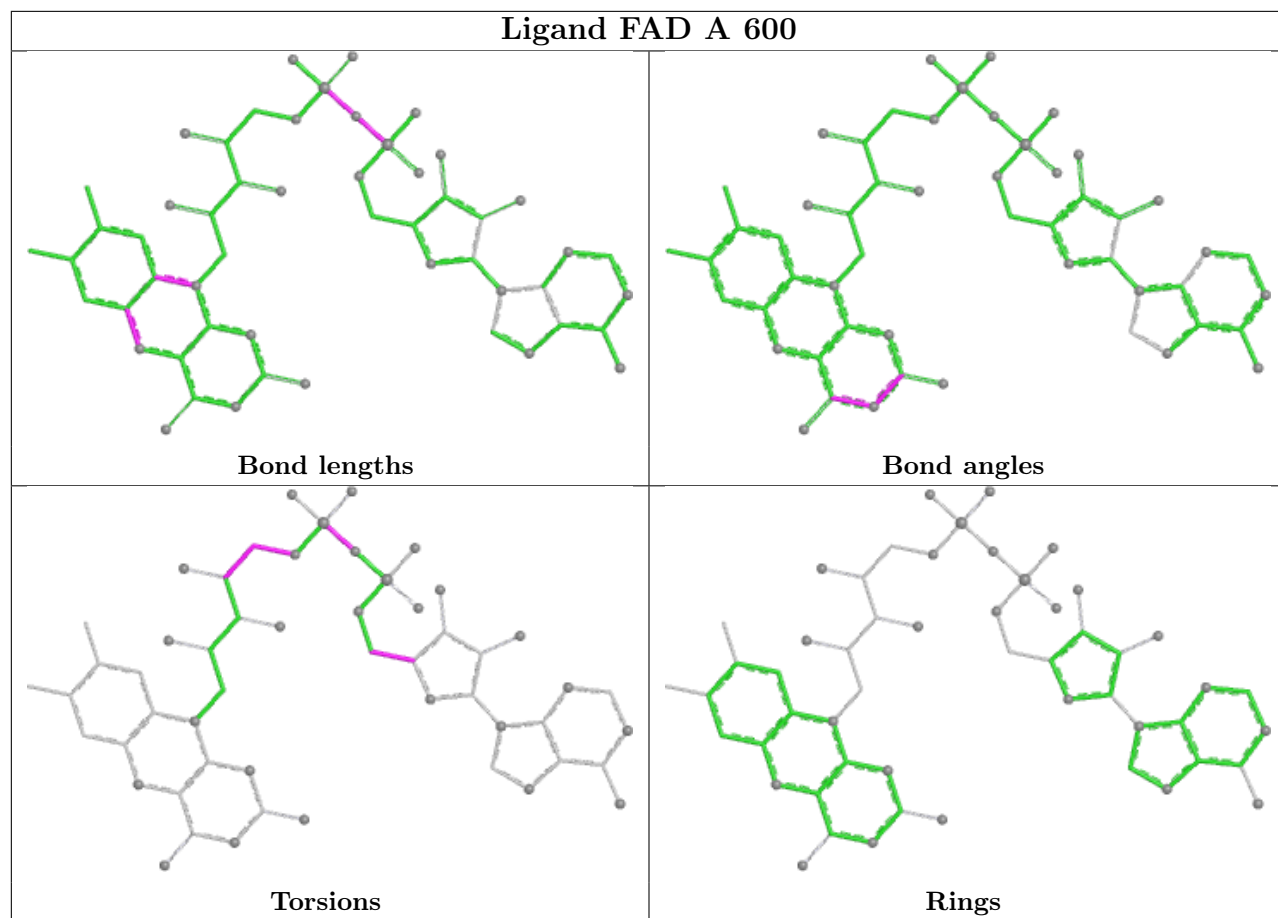
Mol	Chain	Res	Type	Atoms
2	A	600	FAD	C3'-C4'-C5'-O5'
2	B	600	FAD	C3'-C4'-C5'-O5'
2	A	600	FAD	C4'-C5'-O5'-P
2	B	600	FAD	C4'-C5'-O5'-P
2	A	600	FAD	O4'-C4'-C5'-O5'
2	B	600	FAD	O4'-C4'-C5'-O5'
2	A	600	FAD	PA-O3P-P-O1P
2	B	600	FAD	PA-O3P-P-O1P
2	A	600	FAD	O4B-C4B-C5B-O5B
2	B	600	FAD	O4B-C4B-C5B-O5B
2	A	600	FAD	PA-O3P-P-O2P
2	B	600	FAD	PA-O3P-P-O2P

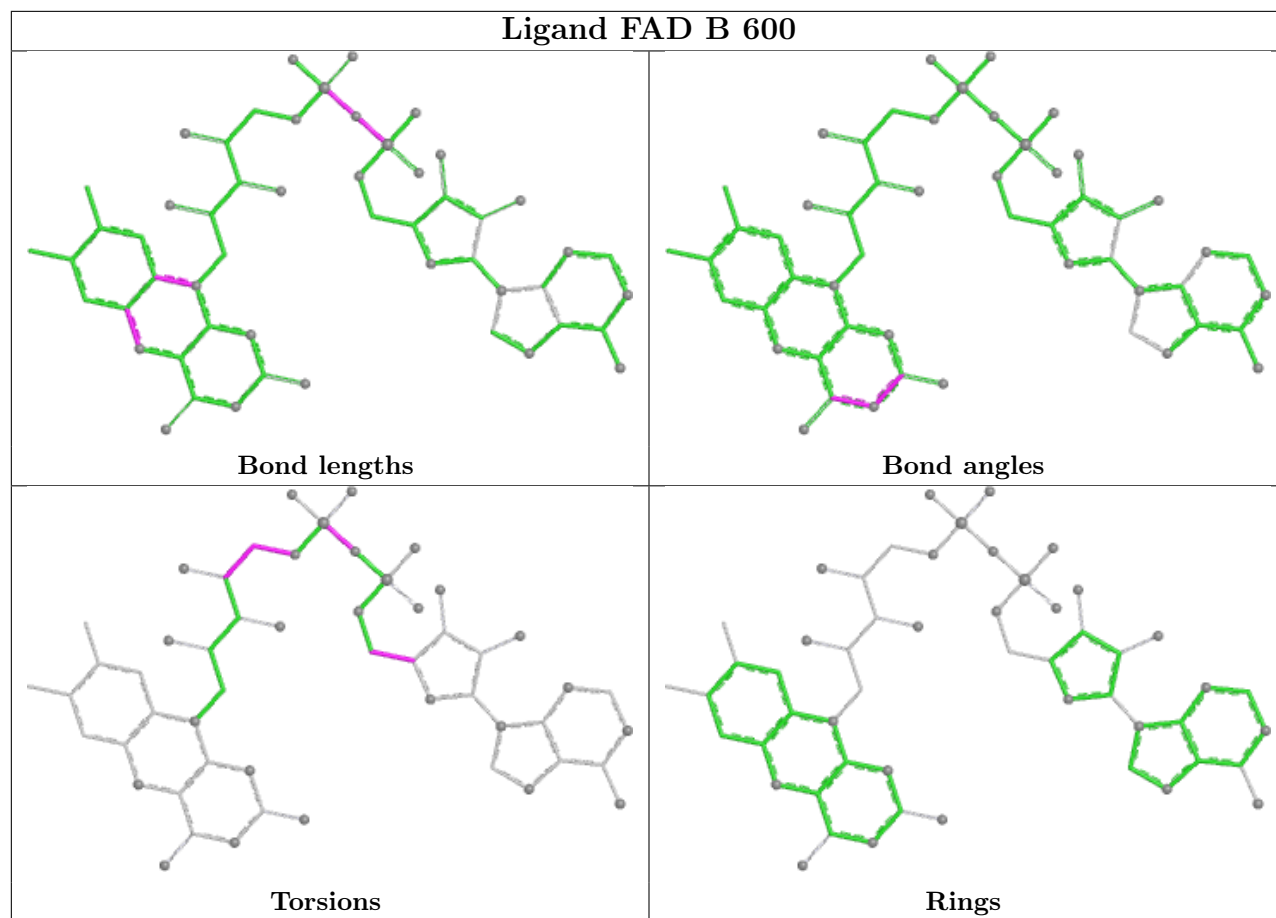
There are no ring outliers.

4 monomers are involved in 23 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	601	NCR	7	0
2	A	600	FAD	6	0
3	A	601	NCR	6	0
2	B	600	FAD	6	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





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.