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1-[2-(3,4-Dichlorophenyl)-5-(3,4,5-trimethoxyphenyl)-2,3-dihydro-1,3,4-oxadiazol-3-yl]ethanone

Dao-Hang He* and Yong-Chuang Zhu

School of Chemistry and Chemical Engineering, South China University of Technology, Guangzhou 510640, People's Republic of China
Correspondence e-mail: daohanghe@yahoo.com.cn

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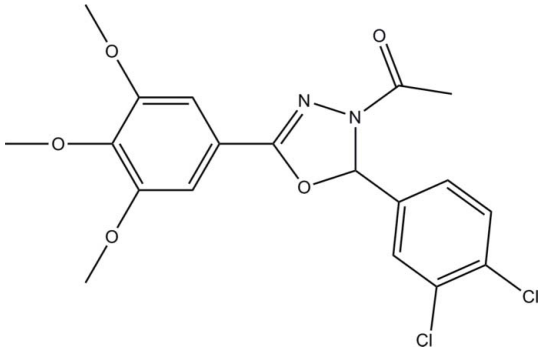
Key indicators: single-crystal X-ray study; T = 173 K; mean σ(C–C) = 0.003 Å; R factor = 0.041; wR factor = 0.126; data-to-parameter ratio = 16.2.

The title compound, $C_{19}H_{18}Cl_2N_2O_5$, was synthesized by the reaction of N'-(3,4-dichlorobenzylidene)-3,4,5-trimethoxybenzohydrazide and acetic anhydride. The oxadiazole ring makes dihedral angles of 82.82 (7) and 9.92 (7)° with the 3,4-dichlorobenzene and the 3,4,5-trimethoxybenzene ring planes, respectively. The crystal structure is stabilized by intermolecular C—H··· O and C—H··· N hydrogen bonds. Intramolecular C—H···O and C—H···N hydrogen bonds are also present.

Related literature

For related literature, see: Abdel *et al.* (2003); Abdel-Rahman & Farghaly (2004); Chai *et al.* (2002); Jin *et al.* (2006); Mohd *et al.* (2004).



Experimental

Crystal data

$C_{19}H_{18}Cl_2N_2O_5$ M_r = 425.25
Monoclinic, $P2_1/c$
a = 7.6743 (4) Å
b = 15.9516 (8) Å
c = 15.7483 (8) Å
β = 90.8940 (10)°
V = 1927.63 (17) Å^3
Z = 4
Mo $K\alpha$ radiation
μ = 0.37 mm^{-1}
T = 173 (2) K
0.47 × 0.39 × 0.32 mm

Data collection

Bruker SMART 1000 CCD diffractometer
Absorption correction: multi-scan (*SADABS*; Sheldrick, 2003)
T_{min} = 0.845, T_{max} = 0.890
10032 measured reflections
4159 independent reflections
3238 reflections with $I > 2\sigma(I)$
R_{int} = 0.025

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.041
$wR(F^2)$ = 0.125
S = 1.04
4159 reflections
257 parameters
H-atom parameters constrained
$\Delta\rho_{max}$ = 0.34 e Å^{-3}
$\Delta\rho_{min}$ = −0.31 e Å^{-3}

Table 1
Hydrogen-bond geometry (Å, °).

D—H···A	D—H	H···A	D···A	D—H···A
C6—H6···O4	0.95	2.43	2.772 (2)	101
C8—H8···O2^{i}	1.00	2.56	3.184 (3)	121
C10—H10···O1^{ii}	0.95	2.43	3.302 (3)	153
C13—H13···O5^{iii}	0.95	2.53	3.426 (3)	156
C16—H16*B*···N1	0.98	2.42	2.839 (3)	105
C18—H18*A*···N1^{ii}	0.98	2.53	3.468 (3)	160
C18—H18*C*···O3	0.98	2.36	2.916 (3)	116
C19—H19*A*···O5^{iv}	0.98	2.58	3.233 (3)	124

Symmetry codes: (i) $-x+2, -y, -z+2$; (ii) $-x+1, -y, -z+2$; (iii) $-x+2, -y+1, -z+2$; (iv) $x, -y+\frac{1}{2}, z-\frac{1}{2}$.

Data collection: *SMART* (Bruker, 2001); cell refinement: *SAINT-Plus* (Bruker, 2003); data reduction: *SAINT-Plus*; program(s) used to solve structure: *SHELXTL* (Sheldrick, 2008); program(s) used to refine structure: *SHELXTL*; molecular graphics: *SHELXTL*; software used to prepare material for publication: *SHELXTL*.

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Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: WN2269).

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supporting information

Acta Cryst. (2008). E**64**, o1443 [doi:10.1107/S1600536808020771]

1-[2-(3,4-Dichlorophenyl)-5-(3,4,5-trimethoxyphenyl)-2,3-dihydro-1,3,4-oxadiazol-3-yl]ethanone

Dao-Hang He and Yong-Chuang Zhu

S1. Comment

1,3,4-Oxadiazole derivatives are well known to possess a diverse range of bioactivities in the pharmaceutical and agrochemical fields; these include insecticidal, antibacterial, anticancer, and anti-inflammatory activities (Abdel *et al.*, 2003; Abdel-Rahman & Farghaly, 2004; Chai *et al.*, 2002; Mohd *et al.*, 2004). Here we report the synthesis and crystal structure of a 1,3,4-oxadiazole derivative containing the 3,4,5-trimethoxyphenyl unit (Fig. 1).

The bond lengths and angles in the title compound are in good agreement with expected values. Though the C8 carbon of the oxadiazole ring is sp^3 hybridized, the oxadiazole ring is essentially planar. The oxadiazole ring makes dihedral angles of 82.82 (7)° and 9.92 (7)° with the 3,4-dichlorobenzene and the 3,4,5-trimethoxybenzene ring planes, respectively. These angles are somewhat different from those in a similar crystal structure (Jin *et al.*, 2006). The crystal structure exhibits intermolecular C—H··· O and C—H···N hydrogen bonds which stabilize the molecule. Intramolecular C—H···O and C—H···N hydrogen bonds are also present.

S2. Experimental

N′-(3,4-Dichlorobenzylidene)-3,4,5-trimethoxybenzohydrazide (0.38 g, 1 mmol) in acetic anhydride (8 ml) was refluxed for 2 h until the starting material disappeared, as evidenced by TLC. The resulting cool mixture was then poured into cold water, after filtration. The residue was recrystallized by slow evaporation of a methanol solution.

S3. Refinement

All H atoms were included in the refinement at idealized positions and refined as riding, with C—H = 0.95 (aromatic), 0.98 (methyl), 1.00Å (methine) and U_{iso}(H) = xU_{eq}(carrier atom), where x = 1.5 for methyl, 1.2 for all other H atoms.

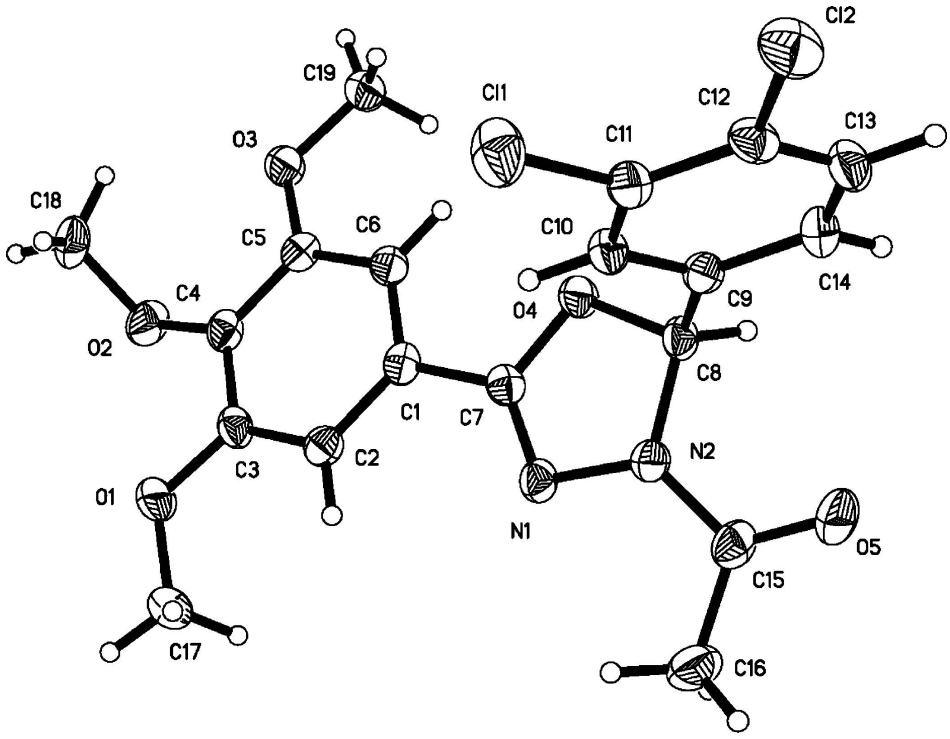

Figure 1

A view of the molecular structure of the title compound, showing the atom-numbering scheme. Displacement ellipsoids are drawn at the 30% probability level. Hydrogen atoms are represented by spheres of arbitrary radius.

1-[2-(3,4-Dichlorophenyl)-5-(3,4,5-trimethoxyphenyl)-2,3-dihydro-1,3,4- oxadiazol-3-yl]ethanone

Crystal data

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$c = 15.7483$ (8) Å
$\beta = 90.894$ (1)°
$V = 1927.63$ (17) Å^3
$Z = 4$
$F(000) = 880$
$D_x = 1.465$ Mg m^{-3}
Mo $K\alpha$ radiation, $\lambda = 0.71073$ Å
Cell parameters from 5138 reflections
$\theta = 2.6$–27.1°
$\mu = 0.37$ mm^{-1}
$T = 173$ K
Block, colorless
0.47 × 0.39 × 0.32 mm

Data collection

Bruker SMART 1000 CCD diffractometer
Radiation source: fine-focus sealed tube
Graphite monochromator
ω scans
Absorption correction: multi-scan (*SADABS*; Sheldrick, 2003)
$T_{min} = 0.845$, $T_{max} = 0.891$
10032 measured reflections
4159 independent reflections
3238 reflections with $I > 2\sigma(I)$
$R_{int} = 0.025$
$\theta_{max} = 27.2°$, $\theta_{min} = 1.8°$
$h = -8 \rightarrow 9$
$k = -20 \rightarrow 18$
$l = -13 \rightarrow 20$

Refinement

Refinement on F^2
Least-squares matrix: full
$R[F^2 > 2\sigma(F^2)] = 0.041$
$wR(F^2) = 0.125$
$S = 1.04$
4159 reflections
257 parameters
0 restraints
Primary atom site location: structure-invariant direct methods
Secondary atom site location: difference Fourier map
Hydrogen site location: inferred from neighbouring sites
H-atom parameters constrained
$w = 1/[\sigma^2(F_o^2) + (0.0625P)^2 + 1.3473P]$ where $P = (F_o^2 + 2F_c^2)/3$
$(\Delta/\sigma)_{max} = 0.001$
$\Delta\rho_{max} = 0.34$ e Å^{-3}
$\Delta\rho_{min} = -0.31$ e Å^{-3}

Special details

Geometry. All e.s.d.'s (except the e.s.d. in the dihedral angle between two l.s. planes) are estimated using the full covariance matrix. The cell e.s.d.'s are taken into account individually in the estimation of e.s.d.'s in distances, angles and torsion angles; correlations between e.s.d.'s in cell parameters are only used when they are defined by crystal symmetry. An approximate (isotropic) treatment of cell e.s.d.'s is used for estimating e.s.d.'s involving l.s. planes.

Refinement. Refinement of F^2 against ALL reflections. The weighted *R*-factor *wR* and goodness of fit *S* are based on F^2, conventional *R*-factors *R* are based on *F*, with *F* set to zero for negative F^2. The threshold expression of $F^2 > \sigma(F^2)$ is used only for calculating *R*-factors(gt) *etc*. and is not relevant to the choice of reflections for refinement. *R*-factors based on F^2 are statistically about twice as large as those based on *F*, and *R*- factors based on ALL data will be even larger.

Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å²)

	x	*y*	*z*	U_{iso}*/U_{eq}
Cl1	0.29475 (7)	0.36125 (4)	0.89108 (4)	0.04132 (18)
Cl2	0.44596 (8)	0.54237 (4)	0.85758 (4)	0.03835 (17)
C1	0.7817 (3)	0.05267 (12)	0.99579 (13)	0.0233 (4)
C2	0.7051 (3)	−0.00409 (13)	1.05104 (13)	0.0243 (4)
H2	0.6667	0.0136	1.1053	0.029*
C3	0.6857 (3)	−0.08687 (12)	1.02552 (13)	0.0254 (4)
C4	0.7416 (3)	−0.11303 (12)	0.94532 (13)	0.0250 (4)
C5	0.8160 (3)	−0.05492 (13)	0.89080 (12)	0.0239 (4)
C6	0.8351 (3)	0.02847 (12)	0.91572 (13)	0.0245 (4)
H6	0.8842	0.0683	0.8782	0.029*
C7	0.8153 (3)	0.13859 (12)	1.02448 (13)	0.0229 (4)
C8	0.9032 (3)	0.27301 (12)	1.00923 (13)	0.0240 (4)
H8	1.0284	0.2903	1.0080	0.029*
C9	0.7883 (3)	0.33955 (12)	0.97007 (12)	0.0231 (4)
C10	0.6145 (3)	0.32243 (12)	0.95089 (13)	0.0248 (4)
H10	0.5676	0.2685	0.9619	0.030*
C11	0.5100 (3)	0.38450 (13)	0.91558 (13)	0.0262 (4)
C12	0.5775 (3)	0.46408 (12)	0.90009 (13)	0.0263 (4)
C13	0.7498 (3)	0.48130 (13)	0.91895 (14)	0.0297 (5)
H13	0.7963	0.5354	0.9081	0.036*
C14	0.8548 (3)	0.41901 (13)	0.95392 (13)	0.0268 (4)
H14	0.9735	0.4308	0.9670	0.032*
C15	0.9181 (3)	0.29242 (13)	1.16484 (14)	0.0297 (5)
C16	0.8863 (4)	0.25497 (16)	1.25067 (15)	0.0428 (6)
H16A	0.9930	0.2277	1.2717	0.064*

H16B	0.7925	0.2134	1.2461	0.064*
H16C	0.8525	0.2993	1.2902	0.064*
C17	0.5778 (3)	−0.12792 (16)	1.16051 (15)	0.0383 (6)
H17A	0.6858	−0.1100	1.1892	0.058*
H17B	0.5312	−0.1774	1.1893	0.058*
H17C	0.4923	−0.0824	1.1623	0.058*
C18	0.6289 (3)	−0.22110 (15)	0.85465 (16)	0.0368 (5)
H18A	0.5145	−0.1941	0.8580	0.055*
H18B	0.6143	−0.2821	0.8544	0.055*
H18C	0.6861	−0.2036	0.8024	0.055*
C19	0.9654 (3)	−0.03053 (15)	0.76156 (14)	0.0351 (5)
H19A	0.8912	0.0169	0.7450	0.053*
H19B	1.0019	−0.0607	0.7106	0.053*
H19C	1.0685	−0.0098	0.7925	0.053*
N1	0.7969 (2)	0.16636 (10)	1.09988 (11)	0.0248 (4)
N2	0.8524 (2)	0.25043 (10)	1.09633 (10)	0.0251 (4)
O1	0.6131 (2)	−0.14829 (9)	1.07411 (10)	0.0345 (4)
O2	0.7344 (2)	−0.19688 (9)	0.92680 (10)	0.0354 (4)
O3	0.8701 (2)	−0.08591 (9)	0.81492 (9)	0.0304 (3)
O4	0.87792 (19)	0.19385 (8)	0.96599 (9)	0.0265 (3)
O5	0.9955 (2)	0.35859 (10)	1.15404 (11)	0.0401 (4)

Atomic displacement parameters (Å²)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Cl1	0.0272 (3)	0.0402 (3)	0.0563 (4)	−0.0036 (2)	−0.0087 (2)	0.0089 (3)
Cl2	0.0433 (3)	0.0298 (3)	0.0419 (3)	0.0081 (2)	−0.0035 (2)	0.0093 (2)
C1	0.0220 (9)	0.0187 (9)	0.0290 (10)	0.0012 (8)	−0.0052 (8)	0.0011 (8)
C2	0.0229 (10)	0.0251 (10)	0.0249 (10)	0.0007 (8)	−0.0009 (8)	−0.0016 (8)
C3	0.0252 (10)	0.0206 (10)	0.0303 (11)	−0.0032 (8)	−0.0026 (8)	0.0056 (8)
C4	0.0283 (10)	0.0160 (9)	0.0307 (11)	0.0004 (8)	−0.0043 (8)	0.0000 (8)
C5	0.0243 (10)	0.0225 (10)	0.0247 (10)	0.0030 (8)	−0.0026 (8)	−0.0024 (7)
C6	0.0255 (10)	0.0217 (10)	0.0261 (10)	0.0000 (8)	−0.0034 (8)	0.0027 (8)
C7	0.0217 (9)	0.0210 (10)	0.0260 (10)	0.0009 (8)	−0.0011 (7)	0.0024 (7)
C8	0.0276 (10)	0.0172 (9)	0.0273 (10)	−0.0030 (8)	0.0015 (8)	−0.0023 (7)
C9	0.0280 (10)	0.0194 (9)	0.0219 (9)	0.0003 (8)	0.0017 (8)	−0.0018 (7)
C10	0.0277 (10)	0.0201 (10)	0.0266 (10)	−0.0032 (8)	0.0012 (8)	0.0004 (8)
C11	0.0243 (10)	0.0283 (11)	0.0261 (10)	−0.0029 (8)	0.0004 (8)	0.0007 (8)
C12	0.0328 (11)	0.0211 (10)	0.0250 (10)	0.0042 (8)	0.0020 (8)	0.0035 (8)
C13	0.0363 (12)	0.0201 (10)	0.0328 (11)	−0.0040 (9)	0.0030 (9)	0.0025 (8)
C14	0.0257 (10)	0.0216 (10)	0.0332 (11)	−0.0039 (8)	0.0016 (8)	−0.0016 (8)
C15	0.0363 (12)	0.0215 (10)	0.0312 (11)	0.0032 (9)	−0.0006 (9)	−0.0070 (8)
C16	0.0668 (17)	0.0339 (13)	0.0277 (12)	−0.0001 (12)	−0.0001 (11)	−0.0065 (10)
C17	0.0478 (14)	0.0373 (13)	0.0300 (12)	−0.0120 (11)	0.0034 (10)	0.0064 (10)
C18	0.0350 (12)	0.0305 (12)	0.0448 (13)	−0.0101 (10)	−0.0005 (10)	−0.0107 (10)
C19	0.0431 (13)	0.0345 (12)	0.0279 (11)	−0.0098 (10)	0.0052 (9)	−0.0017 (9)
N1	0.0291 (9)	0.0177 (8)	0.0277 (9)	−0.0016 (7)	−0.0018 (7)	−0.0001 (7)
N2	0.0309 (9)	0.0199 (8)	0.0245 (9)	−0.0015 (7)	0.0001 (7)	−0.0013 (7)

O1	0.0480 (10)	0.0232 (8)	0.0325 (8)	−0.0107 (7)	0.0041 (7)	0.0023 (6)
O2	0.0520 (10)	0.0185 (7)	0.0355 (9)	−0.0018 (7)	−0.0072 (7)	−0.0029 (6)
O3	0.0388 (9)	0.0246 (8)	0.0278 (8)	−0.0043 (6)	0.0048 (6)	−0.0035 (6)
O4	0.0367 (8)	0.0168 (7)	0.0262 (7)	−0.0013 (6)	0.0029 (6)	−0.0010 (5)
O5	0.0531 (10)	0.0255 (8)	0.0416 (10)	−0.0062 (7)	−0.0027 (8)	−0.0096 (7)

Geometric parameters (Å, º)

Cl1—C11	1.730 (2)	C11—C12	1.394 (3)
Cl2—C12	1.734 (2)	C12—C13	1.378 (3)
C1—C6	1.387 (3)	C13—C14	1.388 (3)
C1—C2	1.392 (3)	C13—H13	0.9500
C1—C7	1.465 (3)	C14—H14	0.9500
C2—C3	1.388 (3)	C15—O5	1.224 (3)
C2—H2	0.9500	C15—N2	1.360 (3)
C3—O1	1.367 (2)	C15—C16	1.501 (3)
C3—C4	1.404 (3)	C16—H16A	0.9800
C4—O2	1.370 (2)	C16—H16B	0.9800
C4—C5	1.392 (3)	C16—H16C	0.9800
C5—O3	1.364 (2)	C17—O1	1.429 (3)
C5—C6	1.394 (3)	C17—H17A	0.9800
C6—H6	0.9500	C17—H17B	0.9800
C7—N1	1.277 (3)	C17—H17C	0.9800
C7—O4	1.368 (2)	C18—O2	1.438 (3)
C8—O4	1.446 (2)	C18—H18A	0.9800
C8—N2	1.476 (3)	C18—H18B	0.9800
C8—C9	1.506 (3)	C18—H18C	0.9800
C8—H8	1.0000	C19—O3	1.429 (3)
C9—C10	1.390 (3)	C19—H19A	0.9800
C9—C14	1.391 (3)	C19—H19B	0.9800
C10—C11	1.385 (3)	C19—H19C	0.9800
C10—H10	0.9500	N1—N2	1.409 (2)
C6—C1—C2	121.40 (18)	C12—C13—H13	120.3
C6—C1—C7	119.20 (18)	C14—C13—H13	120.3
C2—C1—C7	119.32 (18)	C13—C14—C9	120.8 (2)
C3—C2—C1	118.83 (19)	C13—C14—H14	119.6
C3—C2—H2	120.6	C9—C14—H14	119.6
C1—C2—H2	120.6	O5—C15—N2	119.3 (2)
O1—C3—C2	124.24 (19)	O5—C15—C16	123.7 (2)
O1—C3—C4	115.06 (18)	N2—C15—C16	117.0 (2)
C2—C3—C4	120.70 (18)	C15—C16—H16A	109.5
O2—C4—C5	122.30 (19)	C15—C16—H16B	109.5
O2—C4—C3	118.03 (18)	H16A—C16—H16B	109.5
C5—C4—C3	119.42 (18)	C15—C16—H16C	109.5
O3—C5—C4	115.61 (18)	H16A—C16—H16C	109.5
O3—C5—C6	124.10 (19)	H16B—C16—H16C	109.5
C4—C5—C6	120.27 (19)	O1—C17—H17A	109.5

C1—C6—C5	119.37 (19)	O1—C17—H17B	109.5
C1—C6—H6	120.3	H17A—C17—H17B	109.5
C5—C6—H6	120.3	O1—C17—H17C	109.5
N1—C7—O4	116.60 (17)	H17A—C17—H17C	109.5
N1—C7—C1	126.14 (18)	H17B—C17—H17C	109.5
O4—C7—C1	117.22 (17)	O2—C18—H18A	109.5
O4—C8—N2	100.90 (14)	O2—C18—H18B	109.5
O4—C8—C9	110.42 (16)	H18A—C18—H18B	109.5
N2—C8—C9	113.01 (16)	O2—C18—H18C	109.5
O4—C8—H8	110.7	H18A—C18—H18C	109.5
N2—C8—H8	110.7	H18B—C18—H18C	109.5
C9—C8—H8	110.7	O3—C19—H19A	109.5
C10—C9—C14	119.51 (18)	O3—C19—H19B	109.5
C10—C9—C8	120.30 (18)	H19A—C19—H19B	109.5
C14—C9—C8	120.18 (18)	O3—C19—H19C	109.5
C11—C10—C9	119.63 (19)	H19A—C19—H19C	109.5
C11—C10—H10	120.2	H19B—C19—H19C	109.5
C9—C10—H10	120.2	C7—N1—N2	104.79 (16)
C10—C11—C12	120.43 (19)	C15—N2—N1	123.09 (17)
C10—C11—Cl1	118.75 (16)	C15—N2—C8	121.12 (17)
C12—C11—Cl1	120.82 (16)	N1—N2—C8	110.70 (15)
C13—C12—C11	120.13 (19)	C3—O1—C17	117.06 (17)
C13—C12—Cl2	119.37 (16)	C4—O2—C18	116.81 (17)
C11—C12—Cl2	120.49 (17)	C5—O3—C19	117.18 (16)
C12—C13—C14	119.45 (19)	C7—O4—C8	106.95 (15)

C6—C1—C2—C3	1.4 (3)	C10—C11—C12—Cl2	−178.89 (16)
C7—C1—C2—C3	−175.26 (18)	Cl1—C11—C12—Cl2	1.2 (3)
C1—C2—C3—O1	179.76 (19)	C11—C12—C13—C14	−0.4 (3)
C1—C2—C3—C4	−0.2 (3)	Cl2—C12—C13—C14	179.24 (16)
O1—C3—C4—O2	−6.1 (3)	C12—C13—C14—C9	0.0 (3)
C2—C3—C4—O2	173.88 (18)	C10—C9—C14—C13	0.0 (3)
O1—C3—C4—C5	179.51 (18)	C8—C9—C14—C13	−179.09 (19)
C2—C3—C4—C5	−0.5 (3)	O4—C7—N1—N2	−0.3 (2)
O2—C4—C5—O3	4.6 (3)	C1—C7—N1—N2	177.36 (18)
C3—C4—C5—O3	178.68 (18)	O5—C15—N2—N1	165.36 (19)
O2—C4—C5—C6	−174.01 (18)	C16—C15—N2—N1	−16.2 (3)
C3—C4—C5—C6	0.1 (3)	O5—C15—N2—C8	12.9 (3)
C2—C1—C6—C5	−1.8 (3)	C16—C15—N2—C8	−168.66 (19)
C7—C1—C6—C5	174.89 (18)	C7—N1—N2—C15	−153.3 (2)
O3—C5—C6—C1	−177.46 (18)	C7—N1—N2—C8	1.6 (2)
C4—C5—C6—C1	1.0 (3)	O4—C8—N2—C15	153.32 (18)
C6—C1—C7—N1	−169.31 (19)	C9—C8—N2—C15	−88.8 (2)
C2—C1—C7—N1	7.4 (3)	O4—C8—N2—N1	−2.2 (2)
C6—C1—C7—O4	8.3 (3)	C9—C8—N2—N1	115.70 (18)
C2—C1—C7—O4	−174.95 (17)	C2—C3—O1—C17	−9.0 (3)
O4—C8—C9—C10	45.1 (2)	C4—C3—O1—C17	171.03 (19)
N2—C8—C9—C10	−67.1 (2)	C5—C4—O2—C18	−65.1 (3)

O4—C8—C9—C14	−135.80 (19)	C3—C4—O2—C18	120.8 (2)
N2—C8—C9—C14	112.0 (2)	C4—C5—O3—C19	−172.83 (18)
C14—C9—C10—C11	0.3 (3)	C6—C5—O3—C19	5.7 (3)
C8—C9—C10—C11	179.43 (18)	N1—C7—O4—C8	−1.2 (2)
C9—C10—C11—C12	−0.7 (3)	C1—C7—O4—C8	−179.02 (17)
C9—C10—C11—Cl1	179.22 (15)	N2—C8—O4—C7	1.92 (19)
C10—C11—C12—C13	0.7 (3)	C9—C8—O4—C7	−117.85 (17)
Cl1—C11—C12—C13	−179.17 (16)		

Hydrogen-bond geometry (Å, º)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
C6—H6···O4	0.95	2.43	2.772 (2)	101
C8—H8···O2^{i}	1.00	2.56	3.184 (3)	121
C10—H10···O1^{ii}	0.95	2.43	3.302 (3)	153
C13—H13···O5^{iii}	0.95	2.53	3.426 (3)	156
C16—H16*B*···N1	0.98	2.42	2.839 (3)	105
C18—H18*A*···N1^{ii}	0.98	2.53	3.468 (3)	160
C18—H18*C*···O3	0.98	2.36	2.916 (3)	116
C19—H19*A*···O5^{iv}	0.98	2.58	3.233 (3)	124

Symmetry codes: (i) −*x*+2, −*y*, −*z*+2; (ii) −*x*+1, −*y*, −*z*+2; (iii) −*x*+2, −*y*+1, −*z*+2; (iv) *x*, −*y*+1/2, *z*−1/2.