Display Elektronik GmbH

DATA SHEET

E-PAPER MODULE

DEE 7681024A – W

8,0“
E-PAPER DISPLAY

Product Specification **Ver.: 0**

30.09.2013

DOCUMENT REVISION	DATE	DESCRIPTION	CHANGED BY	CHECKED BY
0	30.09.2013	First Release.	LY	MHO

CONTENTS

1. General Description

DEE 7681024A-W is an Active Matrix Electrophoresis Display (AM EPD), High-Resolution AM TFT Black/White display module which can be used in portable electronic devices, such as E-book Reader. The module is a TFT-array driving electrophoresis display, with integrated circuits including source and gate drivers. The resolution of the module is 768×1024，and the active area is 8 inch diagonal.

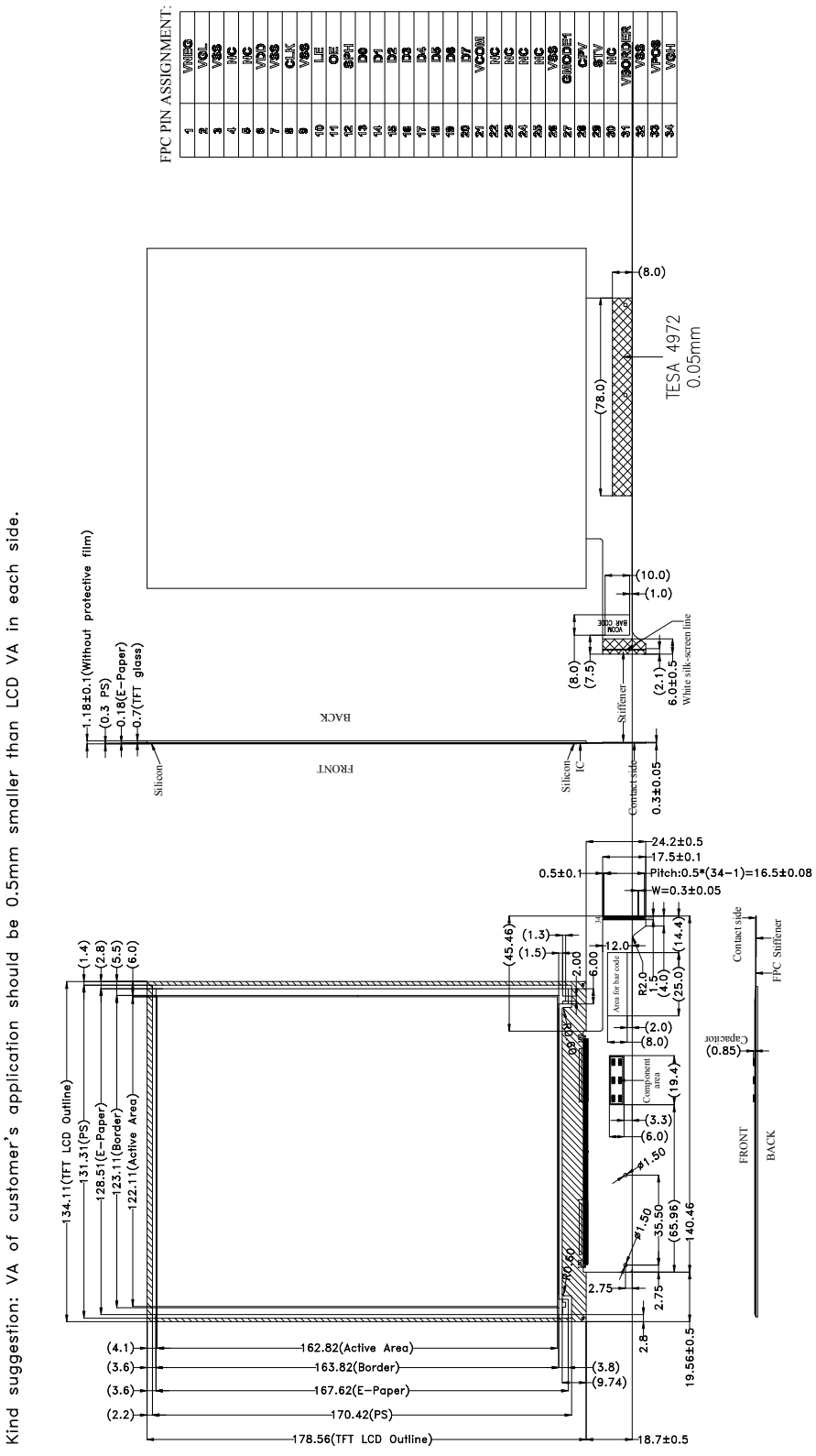
- 768×1024 display
- Contrast Ratio above 8:1
- 3:4 aspect ratio
- Wide viewing angle
- Ultra low power consumption
- Reflective mode
- Bi -stable display
- Commercial temperature range
- Landscape, portrait modes
- Hard-coat antiglare display surface

2. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

Table 1

Parameter	Value	Unit	Remark
Display Resolution	768×1024	dots	
Active area dimensions Horizontal Vertical	122.11 162.82	mm mm	
Screen size	8.0（3:4 diagonal）	Inch	
Pixel pitch Horizontal Vertical	0.159 0.159	Mm mm	
Pixel configuration	Square		
Overall dimensions Width Height Thickness	134.11 178.56 1.18	mm mm mm	



Display Type	8.0inch E-Paper+TFT LCD
Display Resolution	DOTS:768*1024
Viewing direction	Wide viewing angle
Max.Ratio and Bias Level	/
Controller/Driver	/
Logic Voltage	3.0V~3.6V
Driving Voltage	/
Operation Temperature	0°C~+50°C
Storage Temperature	-20°C~+70°C
Backlight Speciality	No backlight
Remark	/

Figure 1: Module Specification

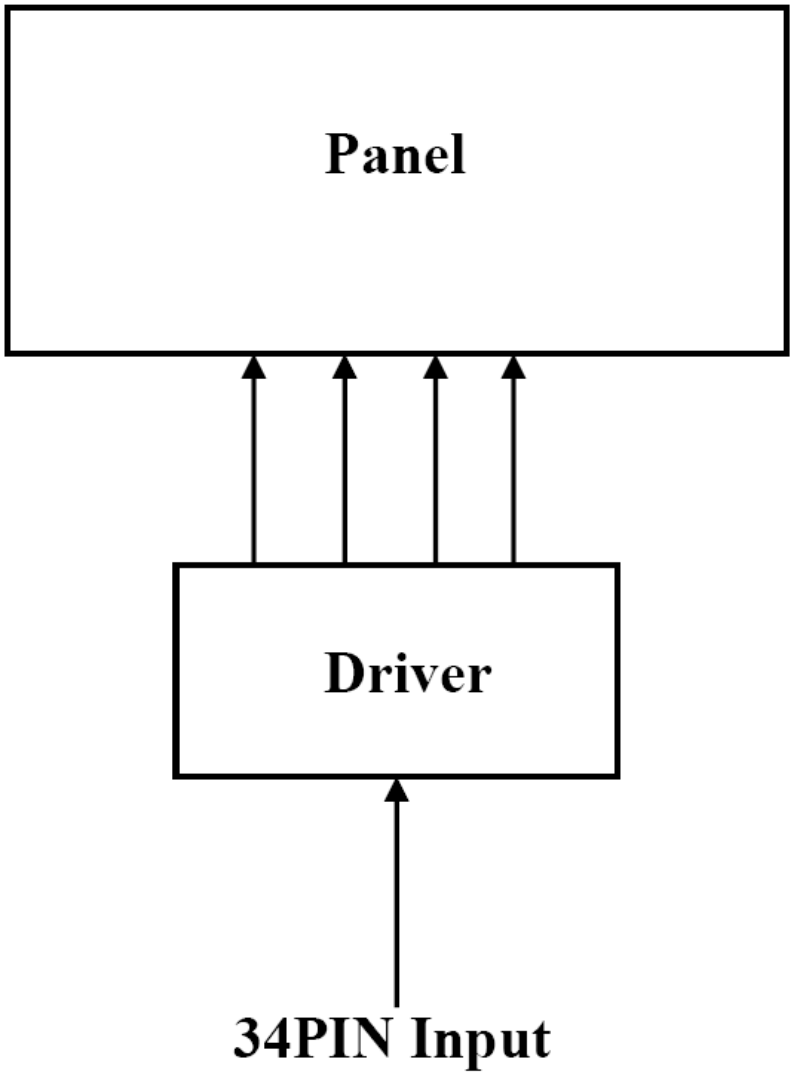


Figure 2: Block Diagram

3. Interface signals

Pin No.	Symbol	Description
1	VNEG	Negative power supply source driver
2	VGL	Negative power supply gate driver
3	VSS	Ground
4	NC	NO Connection
5	NC	NO Connection
6	VDD	Digital power supply drivers
7	VSS	Ground
8	CLK	Clock source driver
9	VSS	Ground
10	LE	Latch enable source driver
11	OE	Output enable source driver
12	SPH	Start pulse source driver
13	D0	Data signal source driver
14	D1	Data signal source driver
15	D2	Data signal source driver
16	D3	Data signal source driver
17	D4	Data signal source driver
18	D5	Data signal source driver
19	D6	Data signal source driver
20	D7	Data signal source driver
21	VCOM	Common connection
22	NC	NO Connection
23	NC	NO Connection
24	NC	NO Connection
25	NC	NO Connection
26	VSS	Ground
27	GMODE1	Output mode selection gate driver
28	CPV	Shift clock input
29	STV	Start pulse gate driver
30	NC	NO Connection
31	VBORDER	Border connection
32	VSS	Ground
33	VPOS	Positive power supply source driver
34	VGH	Positive power supply gate driver

4 Environmental Condition

Item	Operating Temperature (Topr)		Storage Temperature (Tstg)		Remark
	Min.	Max.	Min.	Max.	
Ambient Temperature	0°C	+50°C	-20°C	+70°C	Dry

5. Electrical Specifications

5.1 Module DC characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Signal ground	VSS		-	0	-	V
Logic Voltage supply	VDD		3.0	3.3	3.6	V
	IVDD	VDD=3.3V		1.0	2.5	mA
Gate Positive supply	VGH		21	22	23	V
	IVGH	VGH=22V		0.6	0.7	mA
Gate Negative supply	VGL		-21	-20	-19	V
	IVGL	VGL=-20V		0.7	5.3	mA
Source Positive supply	VPOS		14.6	15	15.4	V
	IPOS	VPOS=15V	-	5	57.3	mA
Source Negative supply	VNEG		-15.4	-15	-14.6	V
	INEG	VNEG=-15V		5	52.3	mA
Asymmetry source	VASYM	VPOS+VNEG	-800	0	800	mV
Common voltage	VCOM		-2.5	Adjusted	0	V
	ICOM		-	0.2	-	mA
Standby power module	PSTBY			-	0.4	mW
Typical power module	PTYP		-	197	1770	mW
Operatingtemperature			0		50	°C
Storage temperature			-20	-	70	°C
Maximum imageupdatetime at 25°C				960	1200	ms

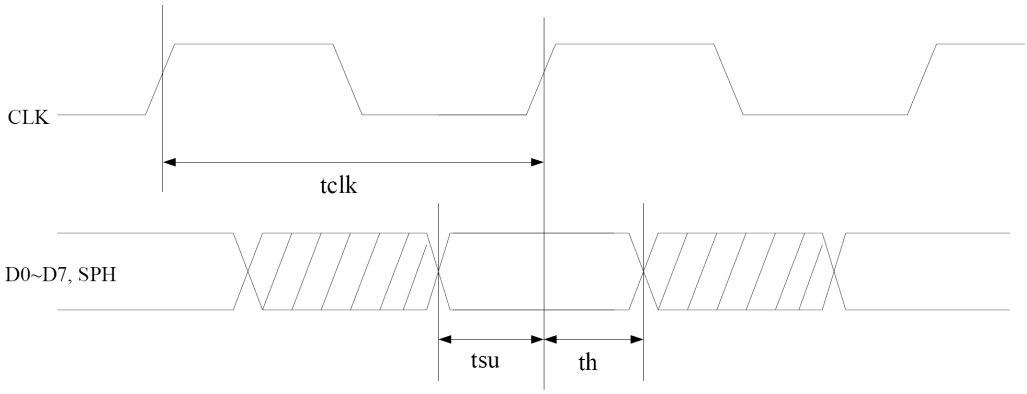
Notes: 1.The maximum power and maximum current are specified for the worst case power consumption. 2.The typical power is measured when “typical images” are displayed. 3. The standby power is the consumed power when the module controller is in standby mode. 4. The listed electrical/optical characteristics are only guaranteed under the controller & waveform provided by JHD.

5.2 Module AC characteristics

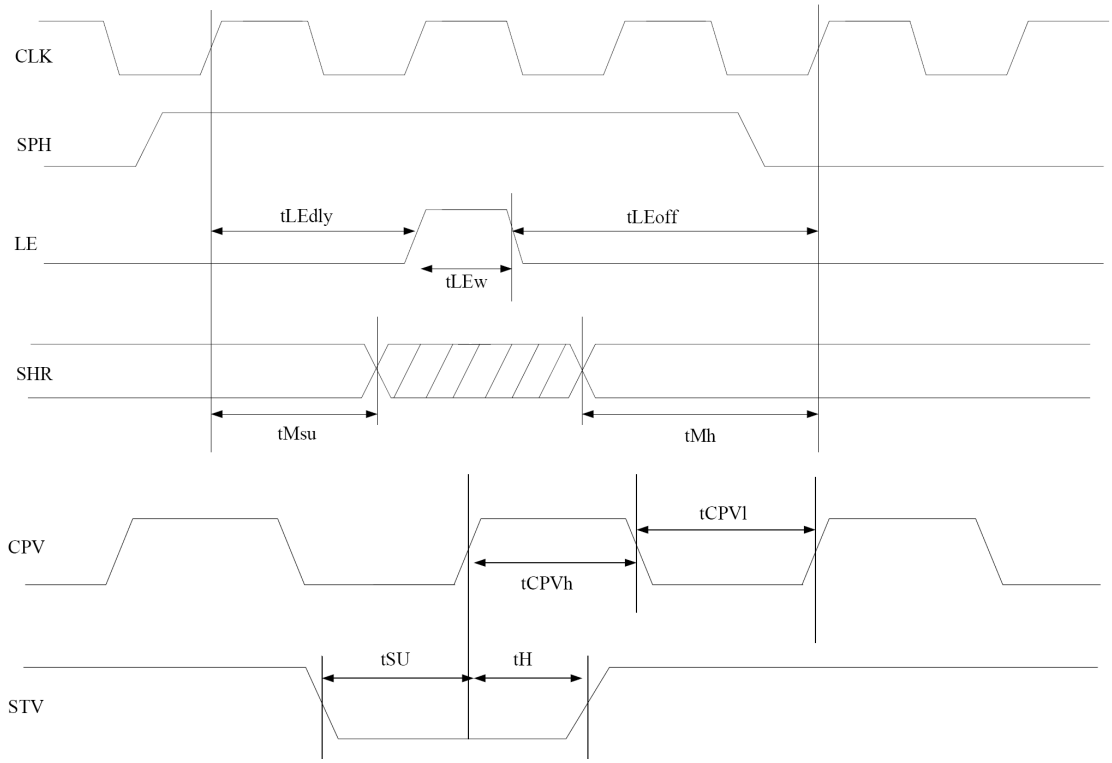
Note: VDD=3.0V to 3.6V, unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	App Pin
Clock frequency	fcpv			200	kHz	CPV
Clock CPV hightime	tCPVh	0.5	-	-	us	
Clock CPV lowtime	tCPVl	0.5	-	-	us	
Data setup time	tSU	100	-	-	ns	CPV STV
Data hold time	tH	100	-	-	ns	
Clock CLKcycle time	tclk	25	-	-	ns	Below table
D0 .. D7, SPH setup time	tsu	12	-	-	ns	
D0 .. D7, SPH hold time	th	12	-	-	ns	
LE on delay time	tLEdly	40	-	-	ns	
LE high-level pulse width	tLEw	150	-	-	ns	
LE off delay time	tLEoff	200	-	-	ns	
SHR setup time	tMsu	100	-	-	ns	
SHR hold time	tMh	100	-	-	ns	

Clock & Data Timing

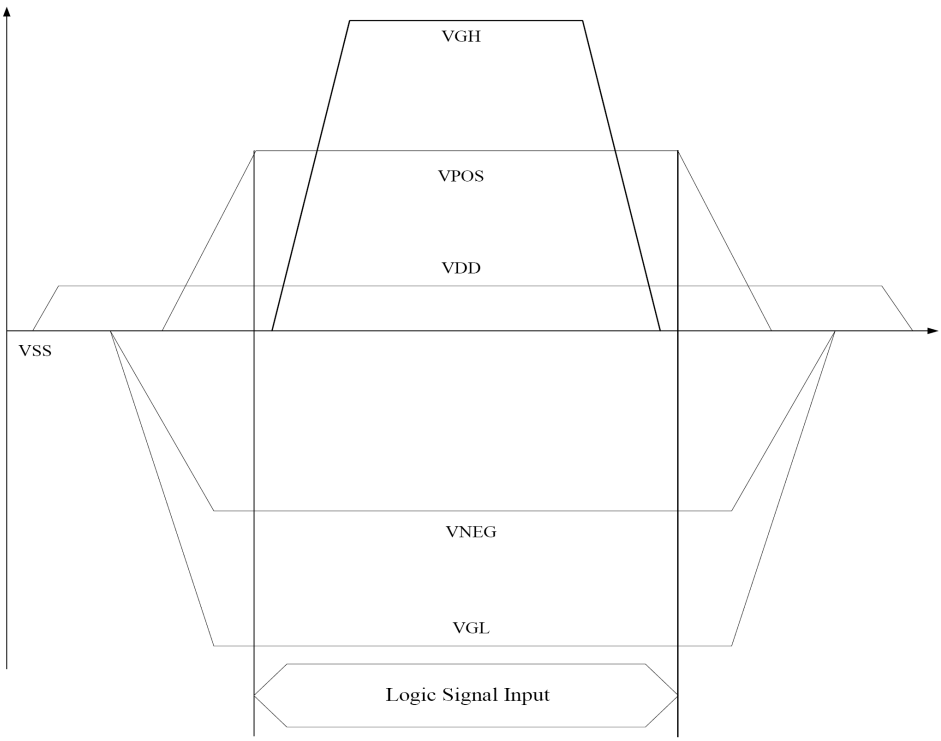


Output Latch/Control Signals



Power On Sequence

VDD -> VNEG -> VPOS (Source Driver) VGL -> VGH（Gate Driver)



6 Optical Specification

6.1 Optical characteristics

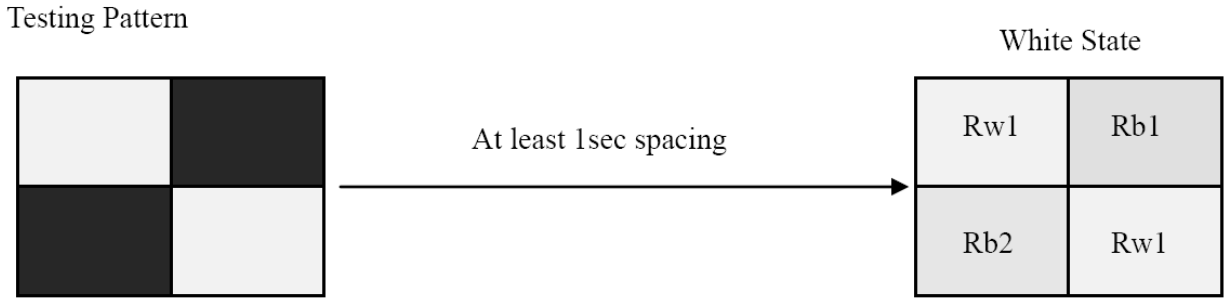
Parameter	Conditions	Values			Units	Notes
		Min.	Typ.	Max		
White Reflectivity	White	35	40		%	
Contrast Ratio (CR)		8:1				1
Image Update Time:	GC16(T=0°C)		1500	1600	ms	
	GC16(T=25°C)		960	1200		
	GC16(T≥35°C)		760	960		
	DU (T=0°C)		500	540		
	DU(T≥20°C)		300	360		
Image Sticking(Ghosting)		-2.0	1.0	2.0		2

(Tamb=25°C, fv=50Hz, Vepd=+/-15V; supply voltage module is 3.3VDC. Measurements are made with Eye-One Pro Spectrophotometer.)

Notes:

1. CR=Surface Reflectance with all white pixel/Surface Reflectance with all black pixels;
2. Ghosting Testing:

2.1.



2.2. Refresh process：Init----GC White----4 checkerboard Pattern GC）----GC White. 2.3. Measuring the reflectance of all 4 checkerboard areas when final white state by Eye-one device. 2.4. Rw: reflectance of area transited from white state; Rb: reflectance of area transited from dark (black) state. 2.5. Calculating averages of WS-to-WS and DS-to-WS transitions: Rw(ave)=(Rw1+Rw2)/2，Rb(ave)=(Rb1+Rb2)/2，G=Rw(ave)-Rb(ave).

7. Reliability test

No.	Test	Condition	Method	Remark
1	High-Temperature Operation	T = +50°C, RH = 30% for 240 hrs	IEC 60068-2-2Bp	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
2	Low-Temperature Operation	T = 0°C for 240 hrs	IEC 60068-2-2Ab	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
3	High-Temperature Storage	T = +70°C, RH=23% for 240 hrs	IEC 60068-2-2Bp	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
4	Low-Temperature Storage	T = -25°C for 240 hrs	IEC 60068-2-1Ab	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
5	High-Temperature, High-Humidity Operation	T = +40°C, RH = 90% for168 hrs	IEC 60068-2-3CA	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
6	High Temperature, High-Humidity Storage	T = +60°C, RH=80% for240hrs	IEC 60068-2-3CA	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
7	Thermal Shock	1cycle:[-25°C30min]→[+70 °C30 min] : 50cycles	IEC 60 068-2-14	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
8	Package Vibration	1.04G, Frequency:10~500HzDirection: X, Y, Z Duration: 1 hours in each direction	Full packed for shipment	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
9	Package Drop Impact	Drop from height of 122 cm on concrete surface. Drop sequence: 1 corner, 3edges, 6 faces One drop for each	full packed for shipment	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
10	Electrostatic Effect(non-operating)	Machine model+/-250V, 0Ω, 200pF	IEC 62179,IEC 62180	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
11	Altitude test Operation	700hPa (= 3000m)48Hr		At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
12	Altitude test Storage	260hPa (= 10000m)48Hr		At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
13	Stylus Tapping	TBD		

8 Handling, Safety, and Environment Requirements

Warning

The display glass may break when it is dropped or bumped on a hard surface. Handle with care. Should the display break, do not touch the electrophoresis material. In case of contact with electrophoresis material, wash with water and soap.

Caution

The display module should not be exposed to harmful gases, such as acid and alkali gases, which corrode electronic components.

Disassembling the display module can cause permanent damage and invalidates the warranty agreements.

Observe general precautions that are common to handling delicate electronic components. The glass can break and front surfaces can easily be damaged. Moreover the display is sensitive to static electrically and other rough environmental conditions.