Cyclone Phailin

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|  |  |
| --- | --- |
| **Extremely Severe Cyclonic Storm Phailin** | |
| **Extremely severe cyclonic storm (IMD scale)** | |
| **Category 5 tropical cyclone (SSHWS)** | |
| [Phailin 2013-10-11 0455Z.jpg](https://en.wikipedia.org/wiki/File:Phailin_2013-10-11_0455Z.jpg)  Phailin at peak intensity on October 11 | |
| **Formed** | October 4, 2013 |
| **Dissipated** | October 14, 2013 |
|  | |
|  | |
| **Highest winds** | [*3-minute sustained*](https://en.wikipedia.org/wiki/Tropical_cyclone_scales#Wind_speed_conversions)*:* 215 km/h (130 mph) [*1-minute sustained*](https://en.wikipedia.org/wiki/Tropical_cyclone_scales#Wind_speed_conversions)*:* 260 km/h (160 mph) |
| **Lowest pressure** | 940 [hPa](https://en.wikipedia.org/wiki/Pascal_(unit)" \o "Pascal (unit)) ([mbar](https://en.wikipedia.org/wiki/Bar_(unit))); 27.76 [inHg](https://en.wikipedia.org/wiki/Inch_of_mercury" \o "Inch of mercury) |
|  | |
|  | |
| **Fatalities** | 45 total |
| **Damage** | $4.26 billion (2013 [USD](https://en.wikipedia.org/wiki/United_States_dollar)) |
| **Areas affected** | [Thailand](https://en.wikipedia.org/wiki/Thailand), [Myanmar](https://en.wikipedia.org/wiki/Myanmar), [India](https://en.wikipedia.org/wiki/India), [Nepal](https://en.wikipedia.org/wiki/Nepal) |
|  | |
| Part of the [**2013 Pacific typhoon season**](https://en.wikipedia.org/wiki/2013_Pacific_typhoon_season)**and the**[**North Indian Ocean cyclone season**](https://en.wikipedia.org/wiki/2013_North_Indian_Ocean_cyclone_season) | |

**Extremely Severe Cyclonic Storm Phailin** ([/ˈpaɪlɪn/](https://en.wikipedia.org/wiki/Help:IPA/English); [Thai](https://en.wikipedia.org/wiki/Thai_language): ไพลิน, [romanized](https://en.wikipedia.org/wiki/Romanization_of_Thai" \o "Romanization of Thai): *Phịlin*, [lit.](https://en.wikipedia.org/wiki/Literal_translation) 'sapphire')[[1]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-1) was the most intense [tropical cyclone](https://en.wikipedia.org/wiki/Tropical_cyclone) to make landfall in India since the [1999 Odisha cyclone](https://en.wikipedia.org/wiki/1999_Odisha_cyclone).[[2]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-2) The system was first noted as a tropical depression on October 4, 2013 within the [Gulf of Thailand](https://en.wikipedia.org/wiki/Gulf_of_Thailand), to the west of [Phnom Penh](https://en.wikipedia.org/wiki/Phnom_Penh) in [Cambodia](https://en.wikipedia.org/wiki/Cambodia). Over the next few days, it moved westwards within an area of low to moderate vertical wind shear, before as it passed over the Malay Peninsula, it moved out of the Western Pacific Basin on October 6. It emerged into the [Andaman Sea](https://en.wikipedia.org/wiki/Andaman_Sea) during the next day and moved west-northwest into an improving environment for further development before the system was named Phailin on October 9, after it had developed into a cyclonic storm and passed over the Andaman and Nicobar Islands into the [Bay of Bengal](https://en.wikipedia.org/wiki/Bay_of_Bengal).

During the next day, Phailin intensified rapidly and became a very severe cyclonic storm on October 10, equivalent to a Category 1 hurricane on the [Saffir–Simpson hurricane wind scale](https://en.wikipedia.org/wiki/Saffir%E2%80%93Simpson_scale" \o "Saffir–Simpson scale) (SSHWS). On October 11, the system became equivalent to a Category 5 hurricane on the SSHWS, before it started to weaken during the next day, as it approached the Indian state of [Odisha](https://en.wikipedia.org/wiki/Odisha" \o "Odisha). It made landfall later that day, near [Gopalpur](https://en.wikipedia.org/wiki/Gopalpur,_Odisha" \o "Gopalpur, Odisha) in Odisha coast, at around 2230 IST (1700 UTC) on October 12. Phailin subsequently weakened over land (becoming a Category 1 tropical cyclone) as a result of frictional forces, before it was last noted on October 14, as it degenerated into a well-marked area of low pressure.

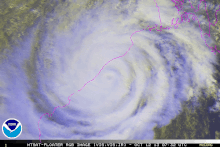
Officials from Odisha's state government said that around 12 million people may be affected. The cyclone prompted India's biggest evacuation in 23 years with more than 550,000 people moved up from the coastline in Odisha and Andhra Pradesh to safer places.[[3]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-3) Total losses were estimated at [₹](https://en.wikipedia.org/wiki/Indian_rupee)260 billion ([US$](https://en.wikipedia.org/wiki/United_States_dollar)4.26 billion) from the storm.

Meteorological history[[edit](https://en.wikipedia.org/w/index.php?title=Cyclone_Phailin&action=edit&section=1)]

[](https://en.wikipedia.org/wiki/File:Phailin_2013_track.png)

Map plotting the track and the intensity of the storm, according to the [Saffir–Simpson scale](https://en.wikipedia.org/wiki/Saffir%E2%80%93Simpson_scale" \o "Saffir–Simpson scale)

On October 4, the [Japan Meteorological Agency](https://en.wikipedia.org/wiki/Japan_Meteorological_Agency) started to monitor a [tropical depression](https://en.wikipedia.org/wiki/Tropical_depression) that had developed in the [Gulf of Thailand](https://en.wikipedia.org/wiki/Gulf_of_Thailand), about 400 km (250 mi) west of [Ho Chi Minh City](https://en.wikipedia.org/wiki/Ho_Chi_Minh_City) in [Vietnam](https://en.wikipedia.org/wiki/Vietnam).[[4]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-4)[[5]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-5) Over the next couple of days, the system moved westward within an area of low to moderate vertical [wind shear](https://en.wikipedia.org/wiki/Wind_shear), before it passed over the Malay Peninsula and moved out of the [Western Pacific Basin](https://en.wikipedia.org/wiki/Tropical_cyclone_basins#Western_Pacific_Ocean) on October 6.[[6]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-6)[[7]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-7)[[8]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-8) The system then subsequently emerged into the [Andaman Sea](https://en.wikipedia.org/wiki/Andaman_Sea) during the next day, before the [India Meteorological Department](https://en.wikipedia.org/wiki/India_Meteorological_Department) (IMD) started to monitor the system as Depression BOB 04, early on October 8.[[9]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-9)[[10]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-BOB_04/2013/01-10)[[11]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-Phalin_TCR-11) During that day, the system moved towards the west-northwest into an environment favorable for more development, before the IMD reported that the system had become a deep depression early on October 9, as it intensified and consolidated further.[[11]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-Phalin_TCR-11)[[12]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-12) The United States [Joint Typhoon Warning Center](https://en.wikipedia.org/wiki/Joint_Typhoon_Warning_Center) (JTWC) subsequently initiated advisories on the depression and designated it as Tropical Cyclone 02B, before the system slightly weakened, as it passed near [Mayabunder](https://en.wikipedia.org/wiki/Mayabunder" \o "Mayabunder) in the [Andaman Islands](https://en.wikipedia.org/wiki/Andaman_Islands) and moved into the [Bay of Bengal](https://en.wikipedia.org/wiki/Bay_of_Bengal).[[13]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-13)[[14]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-14)[[15]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-JTWC_Ad_3-15) After moving into the Bay of Bengal, the system quickly reorganized as it moved along the southern edge of a subtropical ridge of [high pressure](https://en.wikipedia.org/wiki/High_pressure). The IMD reported that the system had intensified into a [cyclonic storm](https://en.wikipedia.org/wiki/Cyclonic_storm) and named it *Phailin*.[[15]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-JTWC_Ad_3-15)[[16]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-16)

[](https://en.wikipedia.org/wiki/File:Phailin_landfall_RGB_Animation_12_Oct_2013.gif)

Satellite loop of Phailin making landfall on the coast of Odisha, on October 12

After it was named, Phailin rapidly intensified further, and became the equivalent of a Category 1 hurricane on the [Saffir–Simpson hurricane wind scale](https://en.wikipedia.org/wiki/Saffir%E2%80%93Simpson_scale" \o "Saffir–Simpson scale) (SSHWS) early on October 10. After bands of atmospheric convection had wrapped into the systems low level circulation center and formed an eye feature.[[17]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-JTWC_Ad_6-17)[[18]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-JTWC_Ad_7-18) Later that day, the IMD reported that the system had become a very severe cyclonic storm, before the JTWC reported that Phailin had become equivalent to a Category 4 hurricane on the SSHWS, after it had [rapidly intensified](https://en.wikipedia.org/wiki/Rapid_deepening) throughout that day.[[19]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-19)[[20]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-JTWC_Ad_8-20) Early the next day the system underwent an eyewall replacement cycle and formed a new eyewall which subsequently consolidated.[[21]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-JTWC_Ad_10-21) After the new eyewall had consolidated the system slightly intensified further, with the JTWC reporting that the system had reached its peak intensity, with 1-minute sustained wind speeds of 260 km/h (160 mph) which made it equivalent to a Category 5 hurricane on the SSHWS.[[22]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-JTWC_Ad_11-22)[[23]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-23) Early on October 12, the system started to weaken as it underwent a second eyewall replacement cycle, before Phailin's eye started to rapidly deteriorate as it moved towards the Indian coast.[[24]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-JTWC_Ad_14-24)[[25]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-JTWC_Ad_15-25) The system subsequently made landfall later that day near [Gopalpur](https://en.wikipedia.org/wiki/Gopalpur,_Odisha" \o "Gopalpur, Odisha) in [Odisha](https://en.wikipedia.org/wiki/Odisha" \o "Odisha), at around 22:30 IST (17:00 UTC), near peak intensity.[[11]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-Phalin_TCR-11) After the system made landfall, the JTWC issued their final advisory on Phailin; on the next day, the IMD reported that the system had weakened into a cyclonic storm. On October 14, Phailin weakened into a well-marked low-pressure area, and the IMD issued their final advisory on the storm.[[26]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-JTWC_Ad_16-26)[[27]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-27)

Preparations and impact[[edit](https://en.wikipedia.org/w/index.php?title=Cyclone_Phailin&action=edit&section=2" \o "Edit section: Preparations and impact)]

[](https://en.wikipedia.org/wiki/File:Phailin_12_Oct_2013.jpg)

Phailin in its second [eyewall replacement cycle](https://en.wikipedia.org/wiki/Eyewall_replacement_cycle" \o "Eyewall replacement cycle) while nearing landfall on 12 October 2013.

**India**[[edit](https://en.wikipedia.org/w/index.php?title=Cyclone_Phailin&action=edit&section=3" \o "Edit section: India)]

In all, 45 people were killed in [India](https://en.wikipedia.org/wiki/India), and the economic losses reached [₹](https://en.wikipedia.org/wiki/Indian_rupee)260 billion (US$4.26 billion).[[28]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-28)

**Andaman and Nicobar Islands**[[edit](https://en.wikipedia.org/w/index.php?title=Cyclone_Phailin&action=edit&section=4" \o "Edit section: Andaman and Nicobar Islands)]

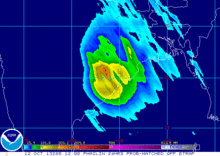
On October 8, the [IMD](https://en.wikipedia.org/wiki/India_Meteorological_Department) warned the [Andaman and Nicobar Islands](https://en.wikipedia.org/wiki/Andaman_and_Nicobar_Islands) that squally to gale-force wind speeds would be recorded over the islands and surrounding sea areas during the next two days.[[10]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-BOB_04/2013/01-10) They also warned that heavy to very heavy rainfall would occur over the islands while some damage to thatched huts, power and communication lines was expected.[[10]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-BOB_04/2013/01-10) These warnings were continued until October 11, when the IMD noted that no further adverse weather, would occur over the Andaman and Nicobar Islands.[[29]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-29) Within the islands the Directorate of Health Services opened a Medical Camp in [Rangat](https://en.wikipedia.org/wiki/Rangat" \o "Rangat), while the Deputy Commissioner, Police and Fire Services all ensured there were no casualties.[[30]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-Flood-30) Between October 8–10, rainfall totals of 734 mm (28.9 in) and 434 mm (17.1 in) were recorded in [Mayabunder](https://en.wikipedia.org/wiki/Mayabunder" \o "Mayabunder) and on the [Long Island](https://en.wikipedia.org/wiki/Long_Island,_Andaman).[[30]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-Flood-30)[[31]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-31)[[32]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-32)[[33]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-33)

**Andhra Pradesh**[[edit](https://en.wikipedia.org/w/index.php?title=Cyclone_Phailin&action=edit&section=5" \o "Edit section: Andhra Pradesh)]

The Andhra Pradesh government and the Chief Minister met representatives of the Army and Navy seeking their assistance if required.[[34]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-34) Utility workers striking against the division of Andhra Pradesh called off their strike partly in view of the cyclone threat to the coastal districts.[[35]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-35) The state government ordered the evacuation of 64,000 people living in low-lying areas.[[36]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-36)

The coastal districts of the state escaped the force of the cyclone. However, [Srikakulam district](https://en.wikipedia.org/wiki/Srikakulam_district" \o "Srikakulam district) experienced heavy rains and gale-force winds which uprooted tall trees and electric poles, shutting down power to areas.[[37]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-phailinberhampur-37) Throughout the state, one person was killed and damage amounted to ₹500 million (US$8.2 million).[[38]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-38) A total of 134,426 people were evacuated in the wake of the storm.[[39]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-imdprelim-39)

**Odisha**[[edit](https://en.wikipedia.org/w/index.php?title=Cyclone_Phailin&action=edit&section=6" \o "Edit section: Odisha)]

[](https://en.wikipedia.org/wiki/File:Phailin_12-Oct-2013_24hr.GIF)

Twenty-four-hour rainfall forecast for Phailin.

Food and relief materials were stocked-up at storm shelters across the state.[[40]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-40) Distant storm warning signal was raised to two at the ports of Paradip and Gopalpur of the state.[[41]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-41) The Chief Minister of Odisha wrote to the Union Defence Minister seeking support from defence personnel, particularly the Air Force and Navy, for rescue and relief operations.[[42]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-42) The Odisha government had made arrangements for over 1,000,560 food packets for relief.[[43]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-43) Indian Air Force helicopters were kept on standby in West Bengal to move in for help at short notice. A total of 1,154,725 people were evacuated in the wake of the storm and the following floods in the state.[[39]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-imdprelim-39)

Heavy rainfall resulted in the death of a woman in Bhubaneswar after a tall tree fell on her.[[44]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-44) Gusty winds resulted in downing of trees and powerlines.[[45]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-45) It was also reported that due to high winds, seven other people were killed in Odisha.[[46]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-46) In a period of 24 hours ending on 13 October, Banki and Balimundali in Odisha received heavy rainfall of 381 mm and 305 mm respectively.[[47]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-47)

As the storm moved inland, wind speeds picked up from 100 km/h (62 mph) to 200 km/h (120 mph) within 30 minutes. [Brahmapur](https://en.wikipedia.org/wiki/Brahmapur,_Odisha" \o "Brahmapur, Odisha), the closest city to the point of landfall suffered devastation triggered by gale winds, with fallen trees, uprooted electric poles and broken walls in various places of the city. However, there were no reports of damage to property or life according to the city police.[[37]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-phailinberhampur-37) As of 18 October, 44 people have been reported dead from Odisha.[[48]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-48)

The high winds and gushing sea that the cyclone brought to [Chilika Lake](https://en.wikipedia.org/wiki/Chilika_Lake" \o "Chilika Lake), India's largest coastal lagoon and home to a large number of endangered animal and plant species, had hit the eco-system that may take years to recover. Mangroves had been uprooted for kilometers. Sea water has left vast stretches of land unsuitable for trees or wild plants. Though the cyclone spared Chilika's most famous residents — the dolphins, there are a few concerns.[[49]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-Hindustan-49)

Losses across Odisha amounted to ₹42.42 billion (US$696 million).[[50]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-50) Phailin damaged crops over 500,000 hectares of agricultural land throughout the state.[[51]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-Mint13-51)

**Jharkhand**[[edit](https://en.wikipedia.org/w/index.php?title=Cyclone_Phailin&action=edit&section=7" \o "Edit section: Jharkhand)]

During October 13, heavy rain from the outer bands of Phailin lashed [Jharkhand](https://en.wikipedia.org/wiki/Jharkhand). A rainfall total of 74.6 mm (2.94 in) was recorded at [Ranchi](https://en.wikipedia.org/wiki/Ranchi), while [Jamshedpur](https://en.wikipedia.org/wiki/Jamshedpur) recorded 52.4 mm (2.06 in), and [Bokaro](https://en.wikipedia.org/wiki/Bokaro_district" \o "Bokaro district) recorded 58.4 mm (2.30 in).[[52]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-IBN-52)

Barring an early morning lightning strike at Simdradhao village in [Giridih district](https://en.wikipedia.org/wiki/Giridih_district" \o "Giridih district) in which a person was killed, according to police, there were no reports of rain-related casualty anywhere in the state. The Disaster Management Department and the district administrations were monitoring the situation.[[52]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-IBN-52)

At least 400 huts were destroyed following heavy rains accompanied by gales in [Pakur district](https://en.wikipedia.org/wiki/Pakur_district" \o "Pakur district) of Jharkhand. Triggered by heavy rains, a couple of pillars of the Irga river bridge were damaged in Giridih District.[[53]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-Niti-53)

**Other Indian states**[[edit](https://en.wikipedia.org/w/index.php?title=Cyclone_Phailin&action=edit&section=8" \o "Edit section: Other Indian states)]

The areas of [West Bengal](https://en.wikipedia.org/wiki/West_Bengal), [Chhattisgarh](https://en.wikipedia.org/wiki/Chhattisgarh), [Bihar](https://en.wikipedia.org/wiki/Bihar) and eastern parts of [Uttar Pradesh](https://en.wikipedia.org/wiki/Uttar_Pradesh) are likely to experience heavy rainfall and strong winds. There is risk of trees falling and disruption of light or electricity poles. However, the effect here will not be as severe as that in [Odisha](https://en.wikipedia.org/wiki/Odisha" \o "Odisha) and [Andhra Pradesh](https://en.wikipedia.org/wiki/Andhra_Pradesh).

A Merchant Ship MV Bingo was feared to have sunk in rough seas off the coast of [West Bengal](https://en.wikipedia.org/wiki/West_Bengal) due to Cyclone Phailin. The crew of 20 were spotted in lifeboats by the Coast Guard and were rescued.[[54]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-54)

**Nepal**[[edit](https://en.wikipedia.org/w/index.php?title=Cyclone_Phailin&action=edit&section=9" \o "Edit section: Nepal)]

[](https://en.wikipedia.org/wiki/File:October_rain_2013_03.jpg)

October rain caused by Phailin cyclone in [Panchkhal](https://en.wikipedia.org/wiki/Panchkhal" \o "Panchkhal) Valley

The eastern region of [Nepal](https://en.wikipedia.org/wiki/Nepal) experienced heavy rainfall and winds while it was lighter in the central and western part of the country. Rainfall began in the eastern and mid-western region since early morning on 13 October and began in the central regional too in the afternoon . The impact of the cyclone continued until 15 October.[[55]](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-Himal-55) Nepalese great festival [Dashain](https://en.wikipedia.org/wiki/Dashain" \o "Dashain) was affected by the October rain. It caused flood in [Kosi](https://en.wikipedia.org/wiki/Kosi_river" \o "Kosi river) and [Gandaki](https://en.wikipedia.org/wiki/Gandaki_river" \o "Gandaki river) rivers in Nepal.[[](https://en.wikipedia.org/wiki/Cyclone_Phailin#cite_note-IEXP-56)