

XYPEX

*PROJECTS IN
ETHIOPIA
(1996 - 1999)*

X Y P E X

PROJECTS IN ETHIOPIA (1996 - 1999)

INTRODUCTION

We first introduced *Xypex* waterproofing to the Ethiopian market in 1996. Prior to marketing the product on a commercial scale, we were engaged in a careful study of the product's chemical characteristics and application procedures alongside extensive technical correspondence with the manufacturers. Having mastered the product's application procedures and chemical characteristics, we began using it for waterproofing works on our own construction projects and soon after began providing specialized waterproofing services for construction projects undertaken by other contractors and property owners. Today, four years after we introduced *Xypex* to the Ethiopian market, it is among the most widely specified waterproofing products in the local construction industry. *Xypex* has thus far been used to waterproof numerous concrete structures, both existing and newly constructed, and has proved to be effective.

The principal aim of this project book, *XYPEX - PROJECTS IN ETHIOPIA (1996 -1999)*, is to outline sample projects in the country on which *Xypex* has been used and to provide one with insight on the range of applications of the product and how it has been used locally.

UNIVERSAL CONSTRUCTION Pvt. Ltd. Co.
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WHAT IS XYPEX?

Xypex is a non-toxic, chemical treatment for the waterproofing and protection of concrete. *Xypex*'s primary and most distinguishing performance feature is its unique ability to generate a non-soluble crystalline formation deep within the pores and capillary tracts of the concrete - a crystalline structure that permanently seals the concrete against the penetration of water and other liquids from any direction. *Xypex* crystalline products are dry powder compounds composed of portland cement, silica sand and many active, proprietary chemicals.

HOW DOES XYPEX WORK?

To create its crystalline waterproofing effect, *Xypex* must become an integral part of the concrete mass. It does so by taking advantage of the natural and inherent characteristics of concrete; concrete is both porous (capillary tract system) and chemical in nature. By means of diffusion, the reactive chemicals in *Xypex* use water as a migrating medium to enter and travel through the capillary tracts in the concrete. This process precipitates a chemical reaction between *Xypex*, moisture and the natural chemical by-products of cement hydration (calcium hydroxide, mineral salts, mineral oxides and unhydrated and partially hydrated cement particles). The result is crystallization and ultimately, a non-soluble crystalline structure that plugs the pores and capillary tracts of the concrete. In this condition, the pores become discontinuous and the concrete is thereby rendered impenetrable by water and other liquids from any direction..

WHAT ARE TYPICAL XYPEX APPLICATIONS?

Some of the typical applications of *Xypex* are:

- | | | |
|----------------------------|-------------------|-------------------|
| ▶ Roofs | ▶ Basements | ▶ Retaining walls |
| ▶ Water Reservoirs | ▶ Terraces | ▶ Balconies |
| ▶ Parking decks | ▶ Swimming pools | ▶ Septic tanks |
| ▶ Chemical units | ▶ Lift shafts | ▶ Bridges |
| ▶ Fountain structures | ▶ Garden planters | ▶ Manholes |
| ▶ Cable ducts and chambers | ▶ Dams | ▶ Concrete silos |

Partially re-printed from *Xypex Chemical Corporation - Specification and Application Manual 1998*.

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PROJECTS IN ETHIOPIA (1996 - 1999)

MEKWOR PLAZA, Addis Abeba.

All roofs, terraces, balconies, elevator pits, basement walls, garden planters, and fountain areas of this building were treated with *Xypex*. Over 2400 kg of *Xypex Concentrate* and 1900 kg of *Xypex Modified* were used on this project to treat over 2300 m². In addition, minor concrete repair works on the elevator pits were done using *Xypex Patch 'n Plug*.



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PROJECTS IN ETHIOPIA (1996 - 1999)

HEAD OFFICE COMPLEX OF THE COUNCIL OF THE REGIONAL STATE OF OROMIA, Addis Abeba.

Under the roof maintenance programme for this complex, the roof slab of the Tower (425 m²) and of the Conference Hall (1300 m²) were treated with *Xypex*. The existing waterproofing layer and the underlying screed were removed and a 5 cm thick concrete layer was cast over the sloping concrete. *Xypex Concentrate* followed by *Xypex Modified* was then applied to the concrete layer.

A total of 1800 kg *Xypex Concentrate* and 1200 kg *Xypex Modified* were used for the project.

Furthermore, the elevator pit that was experiencing seepage of ground water was treated with *Xypex*.



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PROJECTS IN ETHIOPIA (1996 - 1999)

COMMERCIAL BANK OF ETHIOPIA - REGIONAL OFFICE AND BANK BRANCH BUILDING, Bahr Dar.

The roof slab and all terraces and balconies at this building were treated with a two coat system of *Xypex Concentrate* followed by *Xypex Modified*. A total area of 2,370 m² was treated with 1950 kg of *Xypex Concentrate* and 1450 kg of *Xypex Modified*.

In addition an underground water reservoir and pump house were treated with two coats. Extensive concrete repair work was also carried out using *Xypex Patch'n Plug*. All wall surfaces of the reservoir and pump house were then plastered and screed applied to the floors.



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PROJECTS IN ETHIOPIA (1996 - 1999)

LALIBELLA AIRPORT, Lalibella.

The concrete parts of the roof of the terminal building and control tower of this airport were treated with a two coat system of *Xypex*. In addition, the roofs of the generator house, beacon room, and fuel station as well as concrete gutters of the fire and police stations were treated.

The total concrete area treated was 1,100 m².



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PROJECTS IN ETHIOPIA (1996 - 1999)

PAULOS BARAKI BUILDING, Addis Abeba.

The top roof of this building was treated with two coats of *Xypex - Concentrate* followed by *Modified* and was continuously cured for over 72 hours by covering the treated areas with damp burlap. All horizontal joints were "Dry-Packed".

The roof area including the parapets was 366 m² for which 422 kg of *Xypex Concentrate* and 190 kg of *Xypex Modified* were used.



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PROJECTS IN ETHIOPIA (1996 - 1999)

BAHR DAR POLYTECHNIC INSTITUTE, Bahr Dar.

The newly constructed Dormitory Building (455 m²) and Lecture Hall (265 m²) roofs at this institution were treated with a two coat system of *Xypex Concentrate* followed by *Xypex Modified*. 875 kg of *Xypex Concentrate* and 620 kg of *Xypex Modified* were used to treat a total area of 720 m².

A cement screed topping was then applied over the *Xypex* treatment.



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PROJECTS IN ETHIOPIA (1996 - 1999)

RESORT HOTEL, Bahr Dar.

Under the first phase of the waterproofing work plan for this lake side hotel, all balconies, terraces, slanted roofs, and concrete gutters, a total area of 465 m², were treated with *Xypex*. Ceramic floor tiles were then placed over all balcony and terrace floors.

In the second phase of the waterproofing work plan, all flat roofs and canopies, a total area of about 1100 m², will be treated.



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PROJECTS IN ETHIOPIA (1996 - 1999)

AMHARA REGION RURAL ROAD AUTHORITY BUILDING, Bahr Dar.

674 m² of roof area at this office building project was treated with 670 kg of *Xypex Concentrate* and 405 kg of *Xypex Modified*. After completion of *Xypex* application a cement-sand screed layer was placed over the treated surfaces.



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PROJECTS IN ETHIOPIA (1996 - 1999)

WORBEK HOUSE, Addis Abeba.

The roof, terraces, balconies, the elevator pit, basement walls, concrete gutters, flower planters, and a water reservoir in the basement were treated with *Xypex* products. A total of 640 m² of concrete area was treated. Furthermore, over 60 metres of construction joints in the basement walls were repaired with *Xypex Patch 'n Plug* to stop the seepage of water.

Consumption: 550 kg *Xypex Concentrate*, 415 kg *Xypex Modified*, 225 kg *Xypex Patch 'n Plug*.



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PROJECTS IN ETHIOPIA (1996 - 1999)

METTU HOSPITAL, Mettu, Illubabor.

During rains, moisture was seeping through the pointing of gable side walls at this hospital. The top photograph shows the appearance of these walls from inside the rooms before *Xypex* application.



External repair works were done by first chiseling out all existing pointing and re-pointing the stone joints. *Xypex Concentrate* was then applied to the pointing of these walls and cured for 72 hours. The bottom photograph shows the appearance of a typical gable side wall after completion of *Xypex* application.



The *Xypex* treatment was completely effective in preventing the seepage of moisture through these walls. 1150 kg of *Xypex Concentrate* were used to treat a total wall area of 1750 m².



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PROJECTS IN ETHIOPIA (1996 - 1999)

BERHANENA SELAM PRINTING ENTERPRISE, Addis Abeba.

Replacement of the roof waterproofing was part of the renovation works carried out at this 40-year old building. The existing waterproofing layer and light-weight concrete were removed and a new light-weight concrete layer was placed. The newly cast light-weight concrete (750 m²) was then treated with *Xypex Concentrate* (800 kg) followed by *Xypex Modified* (438 kg).



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PROJECTS IN ETHIOPIA (1996 - 1999)

MESKEL FLOWER HOSTEL, Addis Abeba.

A total of 345 m² of balcony areas of Block 1 were treated with *Xypex Concentrate* followed by *Xypex Modified* before laying terrazzo floor tiles.

Total Consumption: 450 kg *Xypex Concentrate*, 275 kg *Xypex Modified*



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PROJECTS IN ETHIOPIA (1996 - 1999)

MOBIL OIL EAST AFRICA LTD. Addis Abeba.

Two newly constructed fire fighting water reservoirs, located at the Mobil Main Depot and Mobil Airport Depot respectively, each with a capacity of 420 m³ were treated with *Xypex Concentrate* followed by *Xypex Modified*.

Prior to *Xypex* application, all surfaces were bush hammered so as to slightly roughen the concrete surfaces.

All defective areas of the concrete were repaired using *Xypex Patch'n Plug*; all vertical and horizontal joints were chiseled and treated with *Xypex Patch'n Plug* and filled to the surface with "Dry-Pac".

A total area of 550 m² was treated with 563 kg of *Xypex Concentrate*, 336 kg of *Xypex Modified* and 100 kg of *Xypex Patch'n Plug*.

15 days after completion of *Xypex* application, the reservoirs were filled with water - *Xypex* was completely effective in waterproofing the reservoirs.



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PROJECTS IN ETHIOPIA (1996 - 1999)

HAILE GEBRE-SELLASE BUILDING, Addis Abeba.

A total area of 385 m² consisting of roofs, terraces, and balconies at this office and apartment building was treated with a two coat system of *Xypex Concentrate* (496 kg) followed by *Xypex Modified* (250 kg).



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PROJECTS IN ETHIOPIA (1996 - 1999)

AGENCY FOR THE ADMINISTRATION OF RENTED HOUSES: DEBRE- ZEIT ROAD SHOPS AND OFFICES BUILDING PROJECT, Addis Abeba.



This 75m³ underground water reservoir and the adjoining pump house were experiencing seepage of ground water. Water levels in the reservoir and pump house were up to depths of 60 cm.

As a solution to this problem, walls and floors of both the reservoir and pump house (a total area of 137 m²) were treated with two coats - *Xypex Concentrate* followed by *Xypex Modified*. All horizontal and vertical joints were chiseled into and filled with *Xypex Patch'n Plug*, followed by "Dry-Pac". Extensive concrete repair work was also carried out by chiseling out all defective concrete and repairing using *Xypex Patch'n Plug*. In addition, the roof of the reservoir was externally treated with two coats (*Xypex Concentrate* followed by *Xypex Modified*) to prevent rain water from entering the reservoir.



After completion of *Xypex* application, all seepage of ground water into the tank was eliminated. The tank was then filled with water and proved to be watertight.

Having attained water tightness, treated surfaces were plastered and screed applied to the floor of the pump house.

Total Consumption:

Xypex Concentrate - 180 kg

Xypex Modified - 124 kg

Xypex Patch'n Plug - 120 kg



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PROJECTS IN ETHIOPIA (1996 - 1999)

MGM BUILDING, Addis Abeba.

345 kg of *Xypex Concentrate* and 194 kg of *Xypex Modified* were used to treat the top roof and the terrace at the 7th floor level - a total area of 370 m².



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PROJECTS IN ETHIOPIA (1996 - 1999)

TEGENE BUILDING, Addis Abeba.

The top concrete roof slabs, elevator pits, electrical cable ducts and manholes at this office building were treated with *Xypex* products. A total of 189 kg of *Xypex Concentrate*, 83 kg of *Xypex Modified*, and 170 kg of *Xypex Patch'n Plug* were used on this project.



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PROJECTS IN ETHIOPIA (1996 - 1999)

SUNSHINE SINO-ETHIOPIAN PHARMACEUTICAL PLANT, Debre-Zeit.

A water fountain (208 m²) and an underground water reservoir (142 m²) at this pharmaceutical plant were treated with a two coat system of *Xypex*.

All horizontal and vertical joints were chiseled into and treated with *Xypex Patch'n Plug* and filled to the surface with "Dry-Pac". Further repair work was done on the concrete of both the reservoir and water fountain to rectify honeycombing and large voids that were present in the concrete.

After completion of *Xypex* application, all treated surfaces were plastered and screed applied to floors.

Total Consumption:

- 612 kg *Xypex Concentrate*
- 285 kg *Xypex Modified*
- 254 kg *Xypex Patch'n Plug*



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PROJECTS IN ETHIOPIA (1996 - 1999)

HAROUN BUILDING, Addis Abeba.

The roof level terrace and various balconies at this office building were treated with *Xypex Concentrate* followed by *Xypex Modified* prior to placement of ceramic floor tiles.

In addition, the walls and floor of the septic tank at basement level were treated with *Xypex*. Beams passing through this septic tank were also treated in order to protect the steel reinforcement from corrosion.



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PROJECTS IN ETHIOPIA (1996 - 1999)

YEKA DEBRE-MEHERET KIDANE-MEHERET CHURCH, Addis Abeba.

The dome of this church was treated with a two coat system of *Xypex* prior to plastering and laying of mosaic tiles. In addition, all horizontal joints were "Dry-Packed".



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PROJECTS IN ETHIOPIA (1996 - 1999)

NAZARETH BUILDING, Addis Abeba.

Because of the ingress of water through the basement walls, the owners were not able to utilize the basement of this building. As a solution to the water problem, the basement walls and floor were treated with *Xypex Concentrate* followed by *Xypex Modified*. All vertical and horizontal joints were chiseled into and treated with *Xypex Patch'n Plug* and filled to the surface with "Dry-Pac".

A combined wall and floor area of 138 m² was treated with 215 kg of *Xypex Concentrate*, 103 kg of *Xypex Modified*, and 68 kg of *Xypex Patch'n Plug*.

The walls were then plastered and a screed applied to the floor, hence enabling the owners to make use of the basement.



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PROJECTS IN ETHIOPIA (1996 - 1999)

ETHIOPIAN CIVIL AVIATION AUTHORITY,
Addis Abeba.

Water was seeping into the inspection pits at this service garage. The *Xypex* treatment applied was completely effective in stopping the seepage.



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PROJECTS IN ETHIOPIA (1996 - 1999)

ETHIO PLASTIC FACTORY, Addis Abeba.

The concrete roof (104 m²) of the transformer house at this plastic factory was treated with a two coat system of *Xypex*. A cement-sand screed layer was then applied over the *Xypex* treated surface.



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PROJECTS IN ETHIOPIA (1996 - 1999)

DH GEDA FLOUR MILL & GIS FACTORY, Addis Abeba.

The roof slab of the Sales and Cashier's Office at this factory was treated with two coats - *Xypex Concentrate* followed by *Xypex Modified*. In addition, one below ground seed collection pit was treated with *Xypex* to prevent the seepage of water into the pit.



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PROJECTS IN ETHIOPIA (1996 - 1999)

TEKESTE BUILDING, Addis Abeba.

Water that seeped into the elevator pits at this building was at times deeper than 20 cm making installation of the elevator impossible.

The *Xypex* system was completely effective in preventing any seepage of water into the elevator pit.



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PROJECTS IN ETHIOPIA (1996 - 1999)

CHANCERY BUILDING OF THE SWEDISH EMBASSY, Addis Abeba.

Moisture was seeping through the stone masonry basement walls (56 m²) and appearing on the inside of the building. As a solution to this problem, the retained soil was excavated, the joints of the stone wall were re-pointed and *Xypex Concentrate* applied to the pointing and the stone surface. 48 hours after *Xypex* application, plastering was applied over the *Xypex* treated surface. A coat of *Xypex Modified* was then applied over the plastering and the excavated soil was back filled 3 weeks later.

The *Xypex* system was fully effective in preventing the ingress of moisture through these walls.



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PROJECTS IN ETHIOPIA (1996 - 1999)

**ETHIOPIAN SEED
ENTERPRISE - SHALLO
BASIC SEED FARM,
Shallo, Sidamo.**

Two below ground seed pits at
this modern farm were treated
with *Xypex* to prevent the ingress
of water.



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PROJECTS IN ETHIOPIA (1996 - 1999)

RESIDENCE BUILDING, Addis Abeba.

Roof level terraces, balconies, concrete gutters, a parking deck, and a water tank stand (a total area of 575 m²) at this newly built mansion were treated with *Xypex Concentrate* (600 kg) followed by *Xypex Modified* (319 kg).



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PROJECTS IN ETHIOPIA (1996 - 1999)

RESIDENCE BUILDING, Addis Abeba.

All concrete gutters and bathroom floors at this newly constructed residence building were treated with *Xypex*. In addition, the roof of the guard house was also treated with *Xypex*.



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PROJECTS IN ETHIOPIA (1996 - 1999)

RESIDENCE BUILDING, Addis Abeba.

The existing waterproofing material at this residence building was damaged and during rains, water was appearing on the underside of the roof slab.

To solve this problem of leakage, the existing waterproofing material and underlying screed were removed to expose the light-weight concrete. A two coat system of *Xypex* was then applied to the light-weight concrete (a total area of 315 m²).

All leakage was eliminated after completion of *Xypex* application.



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PROJECTS IN ETHIOPIA (1996 - 1999)

HEAD OFFICE BUILDING OF SKCAPE CONSULT, Addis Abeba.

The roof of this recently constructed office building was treated with a two coat system of *Xypex Concentrate* and *Xypex Modified*.



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PROJECTS IN ETHIOPIA (1996 - 1999)

RESIDENCE BUILDING, Addis Abeba.

The roofs and balcony areas of this newly constructed residence building were treated with two coats - *Xypex Concentrate* followed by *Xypex Modified*.



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PROJECTS IN ETHIOPIA (1996 - 1999)

RESIDENCE BUILDING, Addis Abeba.

Roof maintenance of this residence building was carried out by removing the worn out waterproofing material and applying *Xypex Concentrate* followed by *Xypex Modified* to the light-weight concrete.



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PROJECTS IN ETHIOPIA (1996 - 1999)

RESIDENCE BUILDING, Addis Abeba.

The existing roof waterproofing material of this residence building had deteriorated and was in need of replacement. The worn out waterproofing layer and the underlying screed were removed and a two coat system of *Xypex* was applied to the light-weight concrete.



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RESIDENCE BUILDINGS, Addis Abeba.

The flat roof area of these two villas experienced the same problem in that water was leaking through the flat roof areas onto the underside of the slabs. The light-weight concrete layer of both roofs were treated with *Xypex Concentrate* followed by *Xypex Modified*.



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PROJECTS IN ETHIOPIA (1996 - 1999)

RESIDENCE BUILDING, Addis Abeba.

The roof slab of this residence building was treated with *Xypex Concentrate* and *Xypex Modified*.



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PROJECTS IN ETHIOPIA (1996 - 1999)

RESIDENCE BUILDING, Addis Abeba.

During rains, water was leaking through the ceramic floor tiles of the roof level terrace and onto the underside of the slab.

To repair this, all ceramic floor tiles and the underlying mortar were removed and *Xypex* was applied. Ceramic tiles were then laid - All leakage ceased after *Xypex* application.



XYPEX

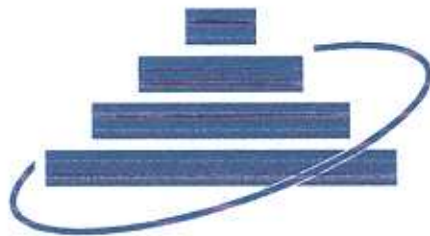
PROJECTS IN ETHIOPIA (1996 - 1999)

RESIDENCE BUILDING, Addis Abeba.

Water was seeping through the floor tiles of the balcony at this residence building. All floor tiles, the waterproofing layer, and the underlying light-weight concrete were removed and a new sloping concrete layer was cast. *Xypex Concentrate* followed by *Xypex Modified* were applied on the latter and floor tiles were placed over the *Xypex* treated surface.

After *Xypex* application, all seepage ceased.





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