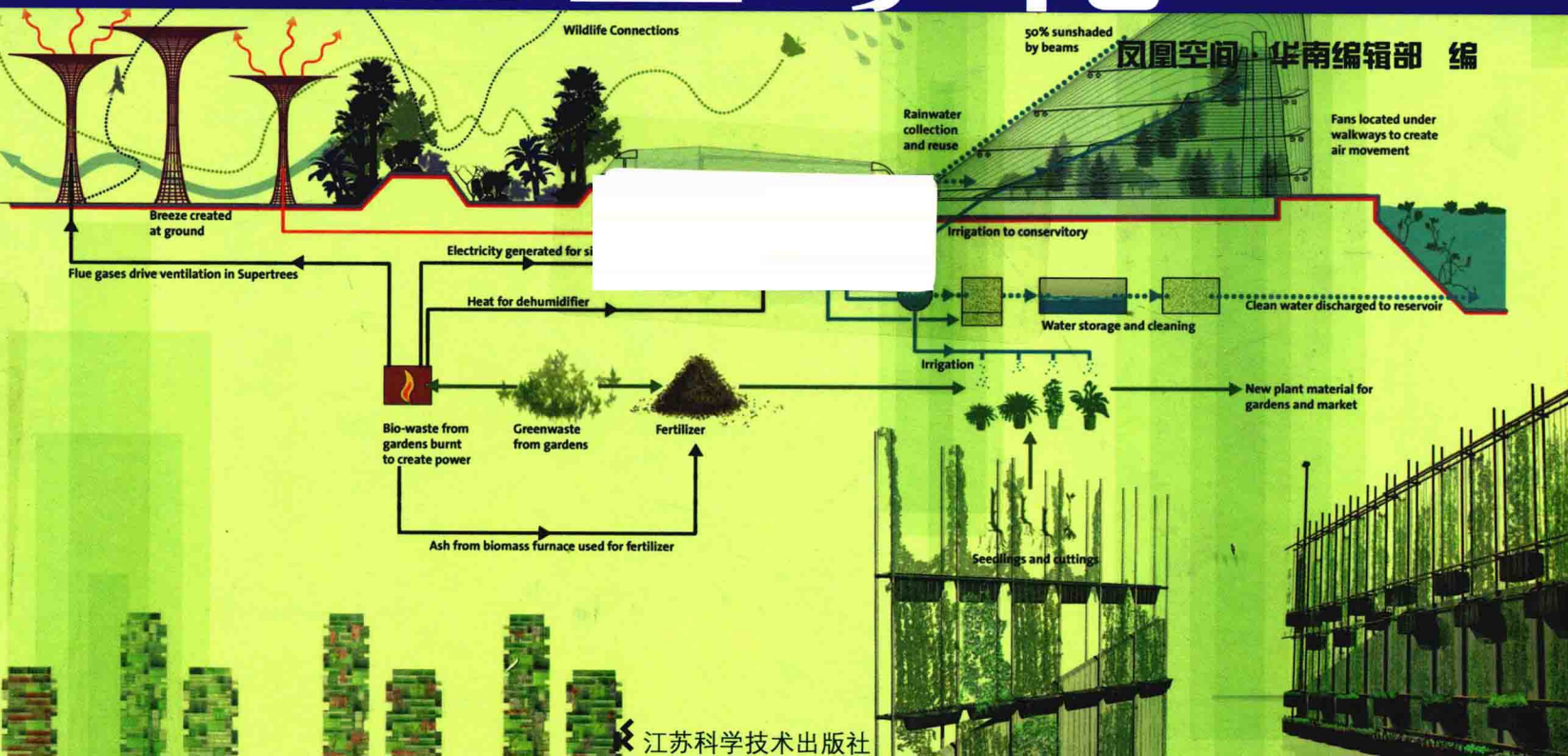


VERTICAL GREENING

垂直绿化



垂
直

VERTICAL GREENING

绿
化

凤凰空间·华南编辑部 编

图书在版编目 (CIP) 数据

垂直绿化 / 凤凰空间·华南编辑部编. — 南京 :
江苏科学技术出版社, 2013. 11
ISBN 978-7-5537-1932-0

I. ①垂… II. ①凤… III. ①垂直绿化—景观设计—
作品集—世界—现代 IV. ①TU986.2

中国版本图书馆CIP数据核字(2013)第208354号

垂直绿化

编 者 凤凰空间·华南编辑部
项目策划 蒋森丽
责任编辑 刘屹立
特约编辑 徐丽贤
责任监制 刘 钧



出版发行 凤凰出版传媒股份有限公司
江苏科学技术出版社
出版社地址 南京市湖南路1号A楼, 邮编: 210009
出版社网址 <http://www.pspress.cn>
总 经 销 天津凤凰空间文化传媒有限公司
总经销网址 <http://www.ifengspace.cn>
经 销 全国新华书店
印 刷 深圳当纳利印刷有限公司

开 本 965 mm×1 270mm 1 / 16
印 张 16.5
字 数 158 400
版 次 2013年11月第1版
印 次 2013年11月第1次印刷

标准书号 ISBN 978-7-5537-1932-0
定 价 248.00元 (USD46.00) (精)

图书如有印装质量问题, 可随时向销售部调换 (电话: 022-87893668)。

1

垂直绿化综述 Summary of Vertical Greening

- 007 立体绿化植物墙的主要技术 /Major Technology
 - 模块式 /Module System
 - 花槽倾斜放置式 /Slant Planting Grooves System
 - 水培式 /Hydroponics System
 - 框架牵引式 /Framework System
- 010 立体绿化植物墙的植物搭配、技术重点及后期养护 /
Arrangement of Plants, Key Technology and
Maintenance
 - 植物品种搭配 /Arrangement of Plants
 - 钢结构的设计及安装 /Design and Installation of the Metal
Framework
 - 自动滴灌控制系统的设计及安装 /Design and Installation of the
Auto-dripping Irrigation System
 - 施工与调试 /Construction and Adjustment
 - 培养基体安装 /Installation of the Culture Elements
 - 自动控制系统安装 /Installation of the Auto-control System
 - 立体绿化植物墙的后期维护 /Maintenance
- 013 立体绿化的国际发展概况 /International Development
of Vertical Greenery
 - 立体绿化在国外 /Oversea Development of Vertical Greenery
 - 立体绿化在中国 /Vertical Greenery in China

2

水培式 Hydroponics System

- 022 艺术品收藏阁的垂直花园 /Rehabilitation of Penthouse for
Art Collectors
- 028 Jardins de Babylone 公司植物墙 /Plant Wall of Jardins de
Babylone
- 032 朱勒 & 吉姆酒店的植物墙 /Plant Walls of Hotel Jules & Jim
- 036 植物屏障 /The Screen of Plant
- 040 植物柱 /The Plant Columns
- 046 Cosmos 100 宾馆的垂直生态系统 /Hotel Cosmos 100
- 048 螺旋垂直花园 /Spirale Vertical Garden
- 052 i-bank 概念店植物墙 /i-bank Store Vertical Garden
- 056 绿色生态艺术 /Art Green Living
- 066 唯港荟酒店的植物墙 /Plant Wall of Icon Hotel
- 070 杜思曼植物墙 /Plant Wall of Dussman Das Kulturkaufhaus
- 072 Patrick Blanc 之家的垂直花园 /Patrick Blanc' s House

6

二维码项目

258 二维码赠送项目

3

模块式 Modular System

- 082 隐形花园工作室 /Reflective Camouflaged Garden Studio
- 090 Edgware 路植物墙 /Plant Wall in Edgware Road
- 100 一级方程式大厦 /Formula One Pit Building
- 104 东林学校 /Tanglin Trust School
- 108 华润置地广安门生态展廊 /CR Land Guanganmen Green Technology Showroom
- 118 圭尔夫大学亨伯学院的植物墙 /University of Guelph-Humber Green Wall
- 122 Corus 娱乐城的植物墙 /Corus Quay Building Green Wall
- 126 PNC 银行 /PNC Bank
- 132 Clarian Health 医院 /Clarian Health
- 136 深圳海境界垂直绿化墙 /Haijingjie Vertical Garden Shenzhen
- 142 深圳京基 100 中心广场 /KK100 Square Shenzhen
- 150 深圳华润君悦酒店垂直绿化墙 /Vertical Wall in Grand Hyatt Shenzhen
- 154 深圳腾讯接待大厅垂直绿化墙 /Tencent Reception Hall Vertical Garden

4

花槽倾斜式 Slant Planting Grooves System

- 162 Casa 商店 /Firma Casa
- 170 早教中心 /The Center for Early Education
- 176 SmogShoppe /SmogShoppe
- 180 SmogShoppe 附属建筑 /SmogShoppe Annex
- 184 联合广场正门 /Union Station Gateway
- 186 植物墙 /Vertical Garden Singles
- 192 苏州星海广场室外垂直绿化工程 /Suzhou Xinghai Square Outdoor Vertical Greening

5

框架牵引式及其他 Framework System and Others

- 198 Green Cast /Green Cast
- 204 “城市森林”垂直花园 /Urban Woods
- 212 三明治植物墙 /Stacking Green
- 218 Lundetangen 的植物墙 /Green Wall at Lundetangen
- 222 花园住宅 /Garden House
- 230 保圣那城市农场 /Pasona Urban FarmDesign Company: Kono Designs LLC.
- 240 垂直森林 /Bosco Vertical Forest
- 244 冷却温室 /Cooled Conservatories
- 250 擎天树 /Supertrees

垂
直

VERTICAL GREENING

绿
化

凤凰空间·华南编辑部 编

1

垂直绿化综述 Summary of Vertical Greening

- 007 立体绿化植物墙的主要技术 /Major Technology
模块式 /Module System
花槽倾斜放置式 /Slant Planting Grooves System
水培式 /Hydroponics System
框架牵引式 /Framework System
- 010 立体绿化植物墙的植物搭配、技术重点及后期养护 /
Arrangement of Plants, Key Technology and
Maintenance
植物品种搭配 /Arrangement of Plants
钢结构的设计及安装 /Design and Installation of the Metal
Framework
自动滴灌控制系统的设计及安装 /Design and Installation of
the Auto-dripping Irrigation System
施工与调试 /Construction and Adjustment
培养基体安装 /Installation of the Culture Elements
自动控制系统安装 /Installation of the Auto-control System
立体绿化植物墙的后期维护 /Maintenance
- 013 立体绿化的国际发展概况 /International Development
of Vertical Greenery
立体绿化在国外 /Oversea Development of Vertical Greenery
立体绿化在中国 /Vertical Greenery in China

2

水培式 Hydroponics System

- 022 艺术品收藏阁的垂直花园 /Rehabilitation of Penthouse for
Art Collectors
- 028 Jardins de Babylone 公司植物墙 /Plant Wall of Jardins de
Babylone
- 032 朱勒 & 吉姆酒店的植物墙 /Plant Walls of Hôtel Jules & Jim
- 036 植物屏障 /The Screen of Plant
- 040 植物柱 /The Plant Columns
- 046 Cosmos 100 宾馆的垂直生态系统 /Hotel Cosmos 100
- 048 螺旋垂直花园 /Spirale Vertical Garden
- 052 i-bank 概念店植物墙 /i-bank Store Vertical Garden
- 056 绿色生态艺术 /Art Green Living
- 066 唯港荟酒店的植物墙 /Plant Wall of Icon Hotel
- 070 杜思曼植物墙 /Plant Wall of Dussman Das Kulturkaufhaus
- 072 Patrick Blanc 之家的垂直花园 /Patrick Blanc's House

6

二维码项目

258 二维码赠送项目

3

模块式 Modular System

- 082 隐形花园工作室 /Reflective Camouflaged Garden Studio
- 090 Edgware 路植物墙 /Plant Wall in Edgware Road
- 100 一级方程式大厦 /Formula One Pit Building
- 104 东林学校 /Tanglin Trust School
- 108 华润置地广安门生态展廊 /CR Land Guanganmen Green Technology Showroom
- 118 圭尔夫大学亨伯学院的植物墙 /University of Guelph-Humber Green Wall
- 122 Corus 娱乐城的植物墙 /Corus Quay Building Green Wall
- 126 PNC 银行 /PNC Bank
- 132 Clarian Health 医院 /Clarian Health
- 136 深圳海境界垂直绿化墙 /Haijingjie Vertical Garden Shenzhen
- 142 深圳京基 100 中心广场 /KK100 Square Shenzhen
- 150 深圳华润君悦酒店垂直绿化墙 /Vertical Wall in Grand Hyatt Shenzhen
- 154 深圳腾讯接待大厅垂直绿化墙 /Tencent Reception Hall Vertical Garden

4

花槽倾斜式 Slant Planting Grooves System

- 162 Casa 商店 /Firma Casa
- 170 早教中心 /The Center for Early Education
- 176 SmogShoppe /SmogShoppe
- 180 SmogShoppe 附属建筑 /SmogShoppe Annex
- 184 联合广场正门 /Union Station Gateway
- 186 植物墙 /Vertical Garden Singles
- 192 苏州星海广场室外垂直绿化工程 /Suzhou Xinghai Square Outdoor Vertical Greening

5

框架牵引式及其他 Framework System and Others

- 198 Green Cast /Green Cast
- 204 “城市森林”垂直花园 /Urban Woods
- 212 三明治植物墙 /Stacking Green
- 218 Lundetangen 的植物墙 /Green Wall at Lundetangen
- 222 花园住宅 /Garden House
- 230 保圣那城市农场 /Pasona Urban FarmDesign
Company: Kono Designs LLC.
- 240 垂直森林 /Bosco Vertical Forest
- 244 冷却温室 /Cooled Conservatories
- 250 擎天树 /Supertrees

1

SUMMARY OF VERTICAL GREENING
垂直绿化综述

依托立体绿化技术 推动城市生态进程

Improving City Life with Vertical Greenery Technology



作者简介：

赵聆汐女士是国际立体绿化专家，毕业于清华大学美术学院（原中央工艺美术学院），多年潜心于立体绿化领域，已申请多项国家专利，对植物配置、景观设计、节水滴灌等有着极深造诣。其专攻领域涵括大型绿化工程项目和小型植物创意产品，而由她全心打造的“一花一草”、“异星部落”等植物创意品牌将自然、艺术、时尚、文化与生活融会贯通，完美阐释对自然的渴望、对艺术的理想、对文化的追溯以及对生活的热爱。

About the Author:

Zhao Lingxi, graduated from college of fine arts, Tsinghua University, is a female specialist in vertical greenery. She has for many years devoted herself to this field, and has gained many national patents. She has great attainments in the arrangement of plants, landscape design and water-saving drip irrigation. Specializing in large-scale greenery project and small greenery products, she proposes the famous brand called “Flower&Green” and “Alien Tribes”, which integrates nature, art, fashion and culture into daily life and clearly expresses her pursuit thereof.

随着我国城市化水平的逐步提高，高层建筑的数量和密度不断增加，而城市地面的可绿化面积却相对减少，这种情况致使城市建设用地和绿化用地的矛盾日益突出，因此城市绿化空间开始不断加大纵向发展的力度。加之生活水平的不断提高，使得人们对工作和居住环境提出了更高的要求，追求建筑和自然环境的和谐统一也成为现代城市规划重要的发展趋势之一。在不增加城市用地的情况下，最大限度地扩大城市的绿化范围、提高绿化覆盖率及提升绿化品质，发展立体绿化不失为一种行之有效的办法。

Increasing urbanization and more ecological contradictions make us realize that plants not only beautify our life, but also help to improve the environment, such as improving microclimate, conserving soil and water, reducing noise pollution, absorbing and decomposing pollutants, and so on. Vertical greenery is an effective way to improve the environment when land use keeps stable and cities need to enlarge green place and to raise

the green coverage rate.

近年来，我国立体绿化技术的研究和应用逐步展开，也在不断创造新的适宜国内当前需要的立体绿化技术。现代立体绿化的适用范围（屋面、墙面、篱栏、棚架、各种立柱、甚至水面、水下等）更广，可利用的植物（藤本、灌木、草本、水生、沉水等）也更多，可配备的技术设备（各种先进的自动灌溉系统、施肥系统、灯光和装饰材料等）也更丰富，人们完全可以在缩短绿化施工时间的前提下，达到更好的景观效果。诚然，这些技术的革新在推动城市生态化的进程中起到了非常关键的作用。

In recent years, vertical greenery technology in China begins to develop. While China learns advanced skills from other countries, it also develops its own technology that is suitable for itself. Modern Vertical greenery can be applied in more areas such as vertical façade, fences, posts and more

plants such as vines, shrubs can be used. In modern greenery there are equipment of auto-sprinkler irrigation, illumination and decorative materials. All these form a better landscape in a shorter time.

同其他绿化方式一样，立体绿化的核心部分也是植物，因此植物的选择和配置成为立体绿化工程中的重要环节。选择立体绿化植物时，必须考虑不同习性的植物对环境条件的要求也不同，还应根据周围环境和植物的观赏效果及功能进行设计，既要选择满足这类生长条件的植物，也要为植物创造其所需要的生长条件，才能实现植物品种的多样化和形式多变的综合景观效果。

Like other ways of greenery, plants are the core in vertical greenery. Therefore, how to choose and arrange plants is very important. In choosing plants, their habits should be carefully considered. Also, designers need to consider the environment the plants will be living in and their appearance and functions, to create suitable growth conditions so that there are more suitable plants and the whole landscape becomes more beautiful.

限于篇幅所致，本文将针对目前最为常见，也是技术发展最为成熟的立体绿化形式，重点讲述立体绿化植物墙的主要技术，以及植物搭配、技术重点及后期养护等相关内容。

We will elaborate in this preface one of the most advanced vertical greenery methods—the green wall and its major technology, the use of plants, its maintenance and other relevant matters.

一、立体绿化植物墙的主要技术 (Major Technology)

现代立体绿化植物墙的主要种植方式分为模块式、花槽倾斜放置式、水培式以及框架牵引式。为延长景观的持续时间，选择的植物多以常绿植物为主。

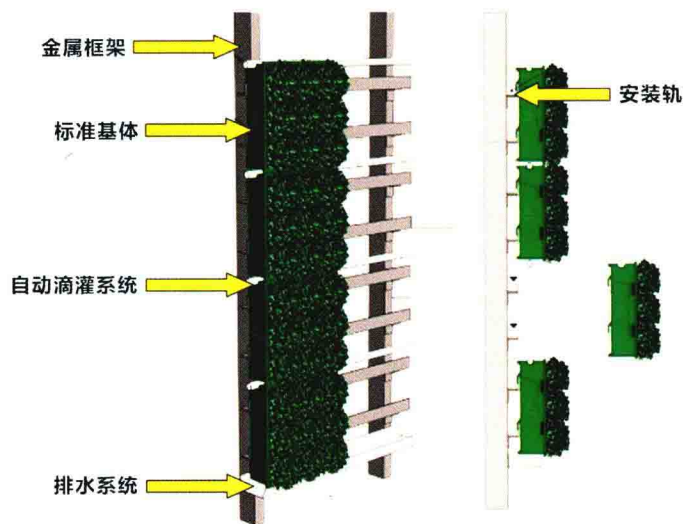
Modern green walls employ mainly four planting methods, i.e. module system, slant plant grooves system, hydroponics system and framework system. In order to keep consistent greenery, evergreen plants are frequently employed.

1、模块式 (Module System)

模块式主要将植物分模块进行种植，是构图能力最强也是效果最好的种植方式。它要求使用统一标准的模块式基盘培养植物，基盘用挂钩或者螺丝等方式固定在金属架构上，基盘内盛装特制的培养基以种植植物。灌溉所采用的自动滴灌系统有着非常明显的优势：植物覆盖率、成活率高。模块式能多品种种植，还可以组成不同的植物图案，而且现场施工时间短，是时效性最长、区域极广、极易维护、效果最好的种植方式。

It is the way through which plants are arranged into many modules. It is also the best way to arrange patterns and create visual effect. Arranging plants into standard module-like plates which hold special nutrients and are fixed on the metal framework by hooks or screws, and equipped with

a drip irrigation system, this model has many advantages such as higher coverage, higher survival rate and more species. Also it can produce various patterns, cost little time to build, keeps on for a long time and is easy to maintain, thus creating the best visual landscape.



模块式立体绿化示意图
Module System Schematic Diagram

最为理想的处理方法是植物在地面培养一到两个月，待充分扎根后，再安装到垂直面上，这样能达到最好的立体绿化效果。植物的选择以覆盖力强、观赏效果好的草本及小灌木等植物为主。室内植物主要选择绿萝、吊兰、粗肋草、合果芋、万年青、网纹草、红掌、白掌、富贵竹、咖啡木、龟背竹、蕨类等；室外阴面主要选择鸭脚木、蕨类、鸢尾、春羽、龟背竹、滴水观音等适阴植物；室外阳面则选择金叶假连翘、黄金榕、小叶女贞、大红花、红花继木、红叶石楠、海桐、毛杜鹃、希美丽、金森女贞、金叶女贞、朱蕉、栀子花、花叶良姜、白纹草、山菅兰、非洲茉莉、红花韭兰等向阳植物。

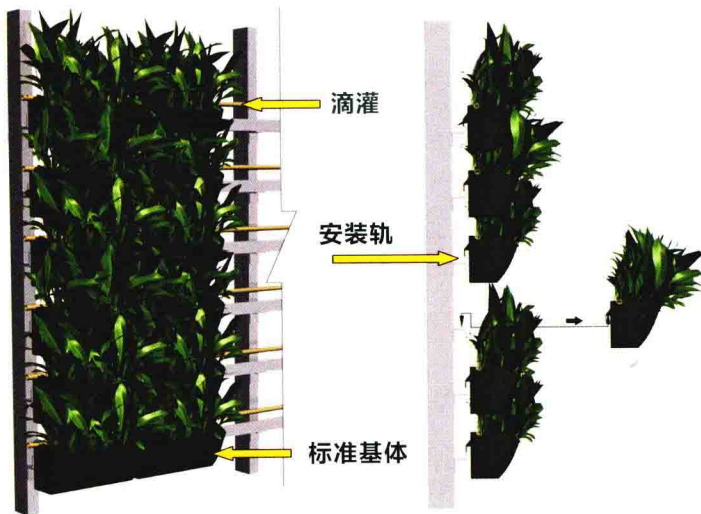
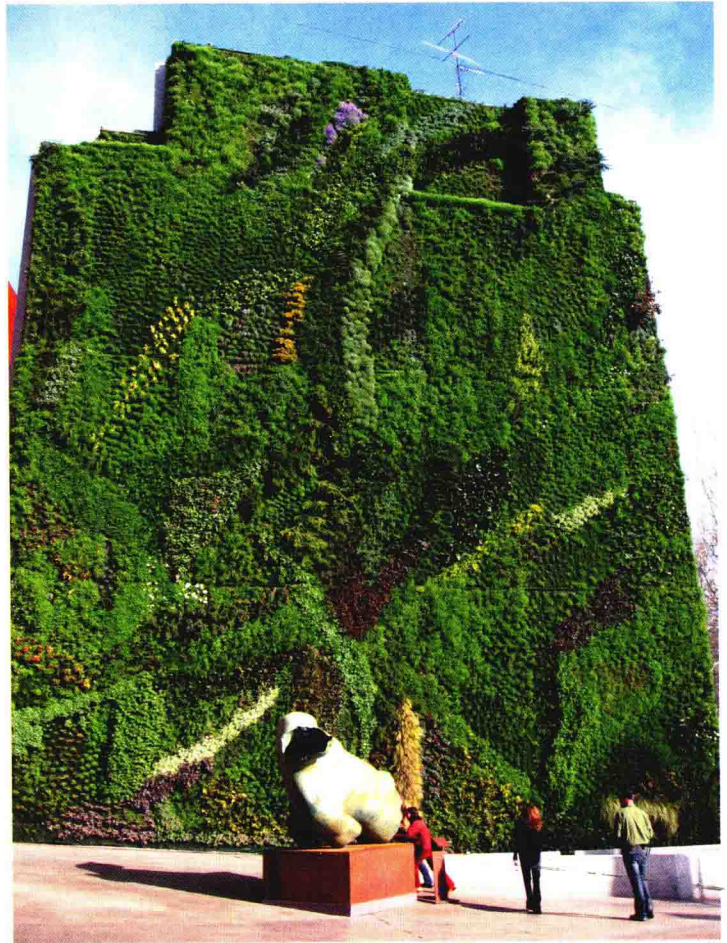
Ideally, plants arranged on the wall should be cultured on the ground to two months to achieve the best results. Herbaceous plants and small shrubs with high coverage, low root and nice visual effect are the best choice. For interior space, *Epipremnum aureum*, *Chlorophytum comosum* (Thunb.) Baker, *Aglaonema modestum* Schott ex Engler, *Syngonium podophyllum* Schott, *Rohdea japonica* (Thunb.) Roth, *Fittonia verschoffeltii* (Lemaire) van Houtte, *Anthurium andraeanum* Linden, *Spathiphyllum kochii* Engl. et Krause, *Dracaena sanderiana* Sander ex Mast., *Zeuzera coffeae* Nietner, *Monstera deliciosa*, *Pteridophyta*, etc are the best choice. Outdoor dark sides mainly employ *Alstonia scholaris* (L.) R. Br., *Ophiopogon intermedius* D. Don, *Reineckia carnea* (Andr.) Kunth, *Ophiopogon bodinieri*, *Pteridophyta*, *Arrhenatherum elatius* (L.) Presl var. *bulbosum* (Willd.) Hyland f. *variegatum* Hitchc., *Ophiopogon japonicus*,

Iris tectorum, etc. On the other hand, sunny sides use *Duranta repens* cv. Dwarf Yellow, *Excoecaria cochinchinensis* Lour., *Serissa japonica* (Thunb.) Thunb., *Ficus microcarpa* L. f. var. *pusillifolia* Liao, *Ligustrum quihoui* Carr., *Hibiscus rosa-sinensis* Linn., *Loropetalum chinense* var. *rubrum* Yieh, *Photinia serrulata* Lindl. var. *serrulata*, *Pittosporum tobira* (Thunb.) Ait., *Rhododendron pulchrum* Sweet, *Allemanda cathartica* L., *Hamelia patens* Jacq., *Ligustrum japonicum* 'Howardii', *Ligustrum* × *vicaryi*, *Codiaeum variegatum* (L.) A. Juss., *Cordyline fruticosa* (L.) A. Cheval., *Bougainvillea glabra* Choisy, *Murraya exotica* L., *Gardenia jasminoides* Ellis, *Alpinia zerumbet* (Pers.) Burt. et Smith, *Chlorophytum bichetii* Hort. ex Backer, *Dianella ensifolia* (L.) DC., *Fagraea ceilanica*, *Zephyranthes carinata* (Spreng.) Herbert and *Euphorbia milii* Ch. des Moulins, etc.

2. 花槽倾斜放置式 (Slant Planting Grooves System)

花槽倾斜放置式与模块式有点相似，只是花槽倾斜放置式的植物生长方向是斜向上。它要求使用硬质花槽或者轻质基袋承载培养基质，使植物沿垂直面向水平面倾斜一定角度生长。其中金属框架固定硬质花槽，花槽内装培养基质以便直接种植植物。

Plants in slant grooves grow up toward a slant vertical dimension. Grooves are often light planting bags or in hard material that are fixed on metal frameworks.



花槽倾斜放置式示意图
Slant Planting Grooves Schematic Diagram

植物的选择以叶大、植株稍高、观赏效果好的多年生常绿花卉及观赏性植物为主。室内主要选择红掌、合果芋、粗肋草、万年青、网纹草、绿萝、龟背竹等耐阴植物；室外阴面主要选择海芋、蕨类、鸢尾、龟背竹、鸭脚木、也门铁、朱蕉、红背桂等适阴植物；室外阳面则主要选择大红花、红桑、变叶木、大叶黄杨、金边黄杨、红叶石楠、南天竹、十大功劳等向阳植物。

Perennial evergreen plants with big leaves, high body and nice visual effect are frequently employed. Major indoor plants are *Anthurium andraeanum* Linden, *Syngonium podophyllum* Schott, *Aglonema modestum* Schott ex Engler, *Rohdea japonica* (Thunb.) Roth, *Fittonia verschaffeltii* (Lemaire) van Houtte, *Epipremnum aureum*, *Monstera deliciosa*, etc. Plants for outdoor shady side are *Alocasia macrorrhiza*, *Pteridophyta*, *Iris tectorum*, *Monstera deliciosa*, *Alstonia scholaris* (L.) R. Br., *Dracaena arborea*, *Cordyline fruticosa* (L.) A. Cheval., *Excoecaria cochinchinensis* Lour., *Calathea roseo-picta* (Lindl.) Regel, while those for the sunny side are *Hibiscus rosa-sinensis* Linn., *Acalypha wilkesiana* Muell.-Arg., *Codiaeum variegatum* (L.) A. Juss., *Buxus megistophylla* Levl., *Euonymus japonicus* Thunb. var. *aurea-marginatus* Hort., *Ligustrum lucidum* Ait., *Photinia serrulata* Lindl. var. *serrulata*, *Nandina domestica* Thunb., *Mahonia fortunei* (Lindl.) Fedde, etc.

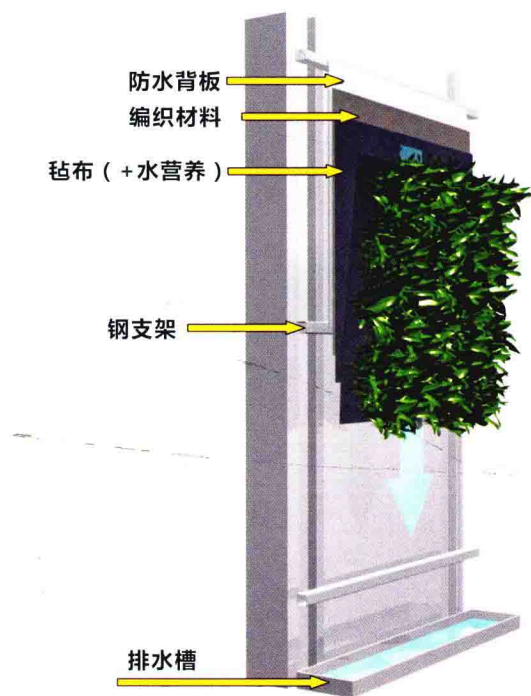
3. 水培式 (Hydroponics System)

水培式主要是利用毡布将植物进行贴植。它以金属框架作为支撑，用PVC板固定造型兼作防水之用，还需将吸水毡布固定在其上，那么植物就可以种植在毡布上了。这种种植方式的核心在于将植物根茎固定于吸水毡布上的定植篮内，并使根系自然垂入植物营养液中，那么营养液就能代替自然土壤向植物体提供水分、氧气、养分等生长因子，使植物正常生长并完成整个生命周期。

In this method, plants are planted on the felt which sticks to the surface of the wall. The key is to ensure that the plants can take their roots into the felt and therefore grow up naturally.

灌溉则采用自上往下渗水的方式。这种灌溉方式的特点在于重量轻，因此适合厚度较薄的绿化墙，也适用于不同的曲面造型。水培式主要适用于室内或室外有散射光的地方。

Such kind of walls often equipped with leaking irrigation system. These walls are light, thin and easy to be built in curve form. Both indoor and outdoor spaces use this kind of wall.



水培式示意图
Hydroponics System Schematic Diagram

植物选择的主要标准就是可以进行水培式培养的植物。室内植物主要选择蕨类、莲花竹、富贵竹、绿萝、网纹草、合果芋、万年青、龟背竹等；室外主要以鸭脚木、三色铁、朱蕉、天门冬、白纹山菅兰、红背桂、吊竹梅、肾蕨等为主。

This kind of walls mainly uses plants that are suitable for water culture. Plants used in interior space are *Pteridophyta*, *Dracaena sanderiana* Lotus, *Dracaena sanderiana* Sander ex Mast., *Epipremnum aureum*, *Fittonia verschaffeltii* (Lemaire) van Houtte, *Syngonium podophyllum* Schott, *Rohdea japonica* (Thunb.) Roth, *Monstera deliciosa*, while those used in outdoor are *Alstonia scholaris* (L.) R. Br., *Dracaena marginata* Lam., *Cordyline fruticosa* (L.) A. Cheval., *Asparagus cochinchinensis* (Lour.) Merr., *Dianella ensifolia* (L.) DC., *Excoecaria cochinchinensis* Lour., *Zebrina*

pendula Schnizl., *Nephrolepis auriculata* (L.) Trimen.

4. 框架牵引式 (Framework System)

框架牵引式是采用金属框架和金属拉索牵引的方式培养植物，主要应用于室外或光照充足的室内。它由金属框架、金属网构成，为植物攀爬提供牵引和支撑，使植物顺着金属网向上自由攀缘。其特点在于成本低、现场施工快及成活率高。但如果想要达到较高的绿化覆盖率，需要两年以上时间，此外可选择的植物品种少，不能构成多变的植物图案。

This kind of wall use metal frameworks and ropes to help the plants climb onto the wall. It is mainly used in outdoor space or indoor space with enough natural light. It cost little money, has a high survival rate and is easy to build. But it needs two years to create a wide coverage. Also the species ready for choose are few. Changeable patterns are hard to arrange in this way.

植物的选择以多年生常绿的藤蔓植物为主，如蒜香藤、炮仗花、凌霄、地锦类、薜荔、紫藤、常春藤、络石、藤本月季等。

Perennial evergreen vines such as *Pseudocalymma alliaceum* (Lam.) Sandwith, *Pyrostegia venusta* (Ker) Miers, *Campsis grandiflora* (Thunb.) Schum., *Parthenocissus* Planch., *Ficus pumila* Linn., *Wisteria sinensis*, *Hedera nepalensis* K. Koch var. *sinensis* (Tobl.) Rehd., *Trachelospermum jasminoides* (Lindl.) Lem., *Morden* cvs. of Climbers and Ramblers, etc. are often employed.



金属网
Metal Networks

二、立体绿化植物墙的植物搭配、技术重点及后期养护 (Arrangement of Plants and Key Technology and Maintenance)

1、植物品种搭配 (Arrangement of Plants)

中国地域辽阔，不同地域的植物差别很大，因此我们必须选择具有与当地气候条件相适应的植物品种。选择好植物后，植物的相互搭配是决定最后的景观效果的关键。

A vast land creates great difference among species from various areas. The selection of plants should therefore take into consideration the local climate and environment. The arrangement of plants determines the final quality of the landscape.

在品种上，我们可以采用木本与草本相搭配的方法，例如鸢尾与鸭脚木搭配种植，这样可以形成高低错落之感。在色相和植物形态上，我们要了解植物在不同季节、不同天气下的色相及形态变化，并充分利用好这些变化。例如：

Combining herbs and woody plants, *Iris tectorum* and *Alstonia scholaris* (L.) R. Br., for example, creates a landscape with gradation and diversity. Colors and shapes of plants may be different in different weather and seasons, so we need to know well about those changes. For example:

点缀式：利用大量绿色观叶植物作为底色，然后选用一些彩色植物或是观花植物点缀其中，形成特定的图案。例如在女贞、黄杨中点缀观花植物，如栀子花；在万年青、绿萝中点缀彩叶植物，如红网纹草。

Embellishment Style: use many green foliage plants as background, and then embellish it with some colorful plants and flowers to form particular patterns. *Ligustrum lucidum* Ait. and *Buxus sinica* (Rehd. et Wils.) Cheng can be decorated with *Gardenia jasminoides* Ellis, while *Rohdea japonica* (Thunb.) Roth and *Epipremnum aureum* can be decorated with red *Fittonia verschaffeltii* 'Pearcei'.



花境式：多种植物错落配置，例如在观花植物中穿插观叶植物，以便呈现植物株形、姿态、叶色、花期各异的观赏效果。又例如粗肋草、合果芋、蕨类等相搭配，形成乱中有序的景观效果。

Flower border: arrange various plants at different heights, and interlace flowers with foliage. In this way, shapes, leaf colors, and florescence make a special landscape. For example, *Aglaonema modestum* Schott ex Engler, *Syngonium podophyllum* Schott and *Pteridophyta* can make a scattered but harmoniously ordered landscape.

多变式：利用植物在不同季节颜色不同或者花期错落的特点，使其在不同的季节可以呈现不同的景观效果。例如双色茉莉，初开的时候是正紫色，随后



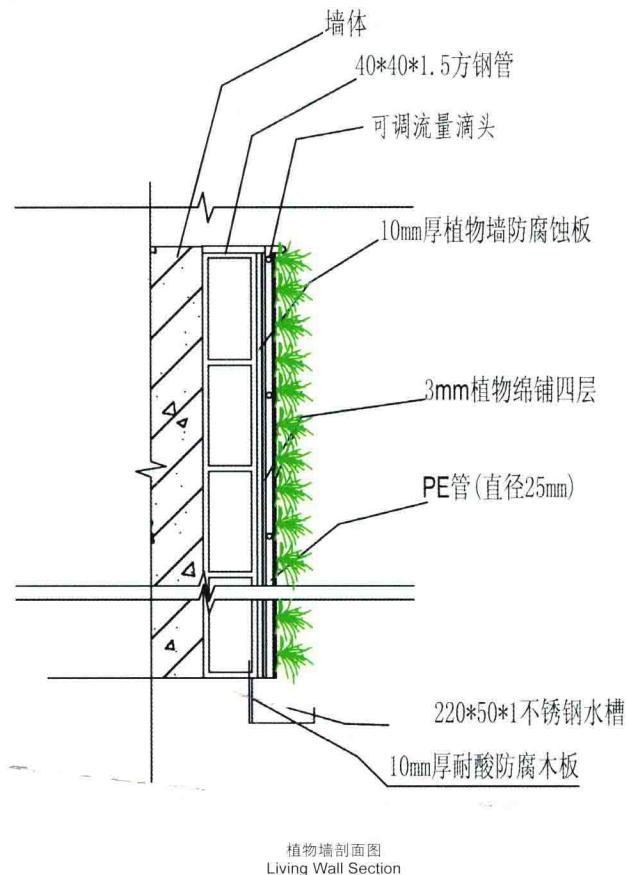
会变成浅紫色（时间很短），然后变成苍白色。又例如红叶石楠在高温天气下会转绿。

Seasonally Changing style: leaves change with seasons. Flowers have different florescence. An arrangement according to these elements can achieve a special landscape. Take *Brunfelsia hopeana* (Hook.) Benth. for example, the original flowers are purple, and then change into light purple, and finally into white. *Photinia serrulata* Lindl. var. *serrulata* changes into

green when it is hot.

同其他园林植物的配置一样，我们必须谨记以下原则：

- (1) 确定立体绿化形式、种植密度及相互间的植物搭配。
- (2) 发挥立体绿化的作用、功能，并与其总体艺术布局相协调。



- (3) 要考虑植物的形态特征以及植物的季节特征。
- (4) 要考虑植物造景在形、色、味、韵上的综合应用。
- (5) 要根据植物的生态习性来配置。

So to arrange them properly, please remember the following rules.

- (1) Confirm the form of vertical greenery and density and arrangement of the plants.
- (2) conform its function to the overall layout of the greenery.
- (3) take into consideration the form of the plants as well as their seasonal feature.
- (4) Integrate shape, color, smell and rhyme of the plants in a whole.
- (5) Arrange plants according to their habits.

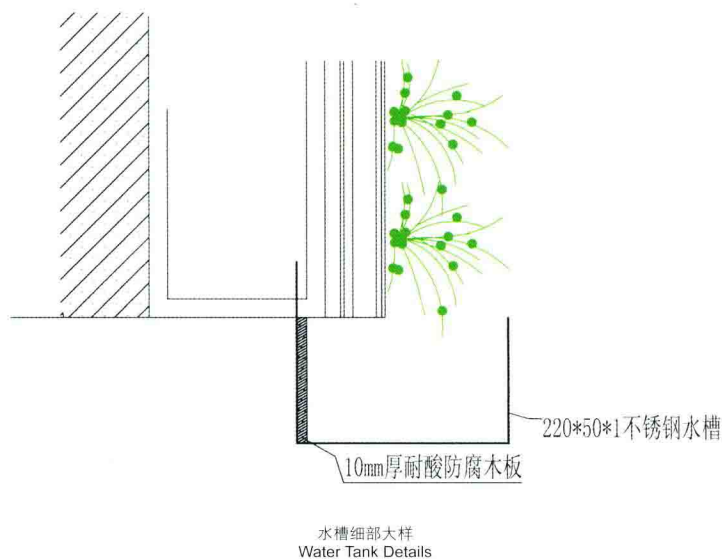
2、钢结构的设计及安装 (Design and Installation of the Metal Framework)

基体钢支架结构必须严格按照《钢结构设计规范》进行设计。第一，钢支架结构与墙体的构筑方式及定位应根据不同的建筑环境，采用合理的结构设计形式。在没有墙体依附的情况下，植物墙需要自主支撑的钢支架结构形式。

第二，钢支架结构在满足植物基体所产生的荷载（动载、静载）的情况下，采用最小用量进行设计。第三，所选用的钢材应具有良好的可焊性。第四，钢支架的制作安装应满足《钢结构工程施工及验收规范》的要求。第五，钢支架安装完成后，钢支架体系的抗拔力应不小于 10 KN，抗剪力应不小于 10 KN。

Basic metal frameworks are designed strictly in accordance with the *Designing Standards of the Metal Framework*. First of all, the metal framework and the wall must be designed based upon specific features of the building. If there is no annex, the wall needs a self-propped metal structure. Second, minimize the use of metal to the extent that it can support the weight of the plants. Third, the metal employed should have high weldability. Fourth, the frame and its installation should conform to the Standards of Construction and Accepting Check of the Metal Framework. Fifth, the framework installed should have a pull-out capacity no lower than 10 KN and a shearing resistance no lower than 10 KN.

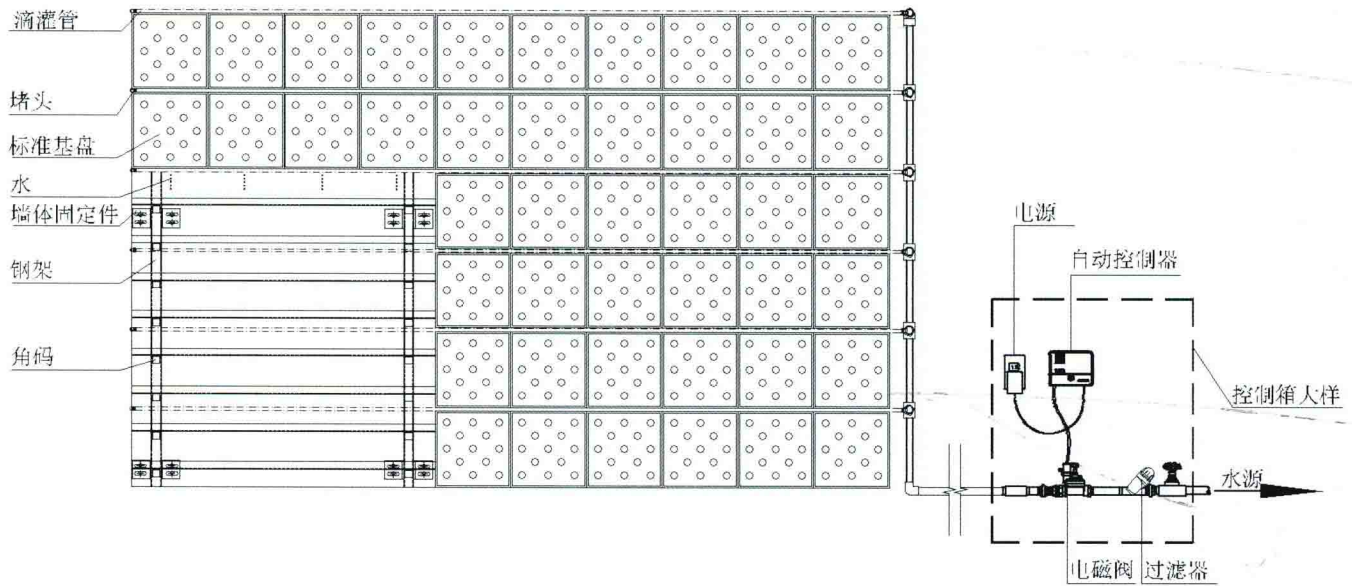
3、自动滴灌控制系统的设计及安装 (Design and Installation of the Auto-dripping Irrigation System)



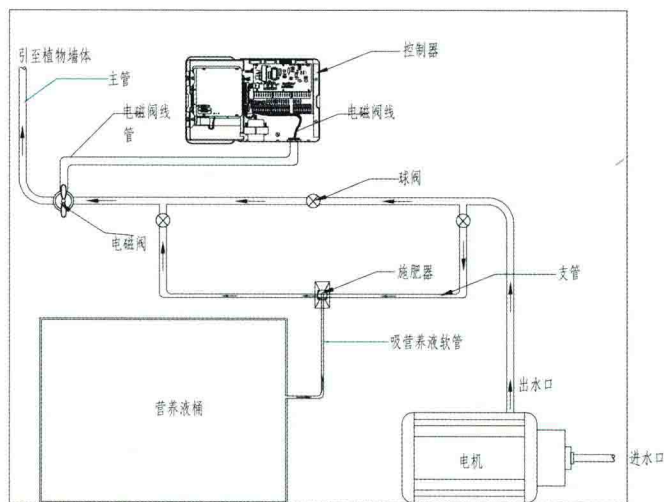
- (1) 自动滴灌系统的给水可用市政用水、中水以及经过处理的雨水。
- (2) 植物墙滴灌范围的分区可根据植物墙的面积、植物习性、气候的季节变化等因素，合理划分滴灌范围，保证植物的水分需求。
- (3) 植物墙的滴灌时间应针对不同的季节、不同的生长环境、不同的植物生长特性等控制滴灌时间的长短。
- (4) 植物墙可设微喷系统达到叶面补水的目的。
- (5) 施工前需进行水压检测。
- (6) 按设计要求安装适合的滴灌管。
- (7) 电磁阀及过滤器按植物分区布置。

- (1) The water it uses could be the municipal water, reclaimed water or purified rain water.
- (2) The whole wall is divided into many irrigation areas according to the area of the wall, the habit of the plant and the seasonal change of the weather, to meet appropriately the needs of the plant.
- (3) The irrigation time should be controlled in accordance with specific season, environment and habit of the plant.

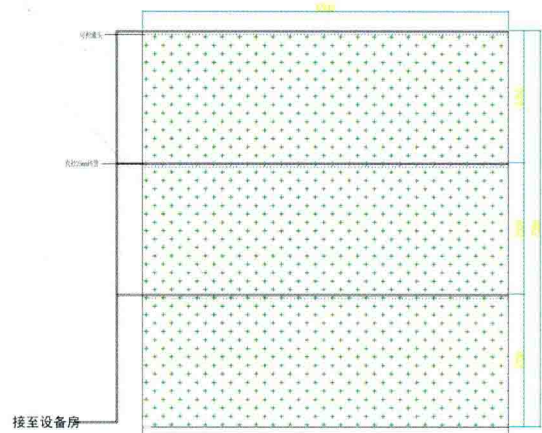
- (4) There could be a micro-sprinkling system to ensure the needs of the foliage.
- (5) There should be a check of the water pressure before the construction.
- (6) Irrigation pipes should be installed in accordance with the design.
- (7) Electromagnetic valves and filters should be arranged based upon the division of the plant.



自动滴灌控制系统设计及安装
Installation of Auto-dripping Irrigation System



设备间详图
Installation Details



植物墙灌溉系统
Living Wall Irrigation System