

9分烤鸭系列丛书

IELTS

Reading

9分烤鸭 雅思阅读 真题解析

雅思阅读资深权威教学专家
陶春全新力作

5年雅思阅读真题
精心收录、精准还原、精彩解读

雅思阅读大咖手把手带你
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陶春◎编著

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9分烤鸭 雅思阅读 真题解析

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The Nature of Yawning
Water Treatment 2: Reed Bed
History of the Telegraph in Communications
Architecture in Britain
Follow Your Nose
Gesture
Grimm's Fairy Tales
Bovids
Bondi Beach
The Contribution of Language to Business
Agriculture and Tourism
The Pearl

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序

每一个测试都离不开“真题训练”，雅思考试也不例外。烤鸭（雅思考生的昵称）们都希望能在走进考场前能多做几套“真题”，了解考试的难度，把握近期考试的方向，测试自身的水平，查找备考中的差距，再次进行查漏补缺，以期在最后的考场上取得满意的成绩。

雅思官方也会定期出版《剑桥雅思考试全真试题集》，目前已出版到11册（简称《剑11》），来满足广大烤鸭们的需求。但是，烤鸭们需要注意的是，首先《剑桥雅思考试全真试题集》系列中收录的题目都是雅思官方今后不会再使用的考题。此外，这些被收录的题目大多年代久远。即便是最新出版的《剑11》，里面收录的考题大多也是几年前在考场出现的题目，还有些题目在中国大陆地区的考场从来没有出现过。

那么问题来了，烤鸭们能不能找到近两年（包括今年）在中国大陆地区考场真实考过的题目呢？这样，烤鸭们的备考才更有针对性！这也正是《9分烤鸭·雅思真题解析》的作者们殚心积虑，努力希望解决的问题。作为作者之一，我和本套丛书的其他作者以前也编著过类似的系列图书，我们深知即将出版的《9分烤鸭·雅思真题解析》对烤鸭们的巨大帮助作用。所以当特约编辑吴蓉老师再次邀约创作此类作品时，我也就欣然答应继续执笔。

在该套丛书创作的过程中，起初我们并没有想到一个合适的名字，打算就叫《真题解析》。随着编写过程的不断推进和深入，我一直希望能有一个更贴切的名字，也同其他作者和编辑反复讨论，但一直未果。直到有一天晚上，我准备把阅读部分原来准备的“词汇详解”板块全部推翻重来，增加我认为对烤鸭们更有帮助的“雅思阅读常考的同义替换和常考的搭配”等内容时，我问自己：这样调整需要很大的工作量，有必要吗？最终我给自己一个肯定明确的答复，“一切都是为了烤鸭们能获得更好的成绩，直至9分！”突然，“9分烤鸭”的名字在我的头脑中灵光一现，这不正是我们孜孜以求的目标吗？让这套《9分烤鸭·雅思真题解析》帮助考生们成为“9分烤鸭”！翌日，我和其他作者及编辑共同讨论，大家对于这一新书名一致认可。

《9分烤鸭·雅思真题解析》系列就是希望成为烤鸭们备考过程中练习和学习的有效助手。烤鸭们可以先练习《剑桥雅思考试全真试题集》系列，熟悉雅思考试的题型、出题方式和测试难度。在考前最后的冲刺阶段可以集中使用《9分烤鸭·雅思真题解析》来把握近期考试的前沿信息和最新动态。《9分烤鸭·雅思真题解析》丛书的真题还原度与测试效度极高——《9分烤鸭·雅思听力真题解析》作者虎劲钻老师是中国大陆地区雅思听力真题还原的权威，对听力真题音频材料的还原，细致到了调整说话语气强弱和语音停顿时长的程度，用他自己的话说，“《9分烤鸭·雅思听力真题解析》可谓良心巨献！”《9分烤鸭·雅思口语真题解析》的作者于磊老师更是将自己数年的教学经验在书中倾囊相授，从思维入手、组句成章，手把手教考生如何攻克雅思口语高频题、难点题。《9分烤鸭·雅思写作真题解析》的作者郑庆利老师在自己总结的48道母题的基础上，耗时一年多，为母题精心打磨每一篇高分范文，并辅以细致的语篇分析、词汇及句型学习，手把手带领烤鸭们攻克雅思写作难关。用专业严谨的治学态度来创作、打磨每一个作品，是《9分烤鸭·雅思真题解析》作者团队一贯秉持的编写原则，而这一切，都只为帮助广大烤鸭获得更理想的成绩！

我们相信《9分烤鸭·雅思真题解析》一定能帮助烤鸭们在雅思备考的关键时期实现突破。烤鸭们除了认真练习《9分烤鸭·雅思真题解析》中的真题，一定要重视书中的其他板块的学习，因为每个板块都是《9分烤鸭·雅思真题解析》的“大厨们”的悉心指导和多年“厨艺”的精华。希望烤鸭们认认真真地利用好这套《9分烤鸭·雅思真题解析》丛书，踏踏实实地稳步前进，祝愿大家在雅思考试中取得满意的成绩！

我们倾尽全力，只为——《9分烤鸭·雅思真题解析》助力烤鸭获得9分！

陶春

2016年9月

前 言

《9分烤鸭·雅思阅读真题解析》(以下简称《9分烤鸭阅读》)是我全新编著的雅思考试阅读真题还原图书。在创作这本书的伊始,我主要考虑从三个方面来体现该书的作用和特色:时效性、指导性和针对性。

首先是时效性。《9分烤鸭阅读》里收录的题目都是近年(2016—2014年)在雅思考场真实出现的真题。这样,烤鸭们可以了解最新的雅思阅读考试的文章内容及题目难度。雅思考试是一项严谨和科学的英语能力水平测试,总体难度不会出现大的波动。虽然如此,但是就阅读考试的特点而言,烤鸭们面对测试难度相当的阅读文章,可能感觉难度差异很大,测试结果也不稳定。因此,考前多练习一些近年考场出现的真题,体会难度差异,稳定自己的做题状态,这点很重要。

其次是指导性。《9分烤鸭阅读》里除了收录近年考试真题,还设置了“词汇详解”“题目详解”和“参考译文”等板块,帮助烤鸭们更好地学习和使用本书。其中“词汇详解”板块中的词汇主要是选择了文章中烤鸭们可能在认知上存在困难的词汇、词组及搭配。希望烤鸭们特别关注该板块中“雅思阅读常见的同义替换”和“雅思阅读中常见的搭配”两部分的内容,这两部分是该板块中的精华所在,以期帮助烤鸭能举一反三和触类旁通。因为雅思阅读考试的一项重要核心技能就是 paraphrase(同义替换),所以该板块强化了对这方面的指导。在“题目详解”中,我对每道题目在原文的重现都进行了梳理,更为重要的是,我把一些题型的解题方法和技巧也蕴含在了该板块的讲解中。希望烤鸭们在学习该板块时,认真理解关于解题方法的介绍,比如对“TRUE/ FALSE/ NOT GIVEN”题型,一定要理解判断的标准和本质,才能更准确地答题。这些在该板块的讲解中都有详细叙述。至于“参考译文”,烤鸭们一定不要做完题就把文章译文看一遍,那样不可取,建议只有题目全部做完后,再次阅读文章遇到不能理解的句子时,再去看相对应的翻译帮助加深理解,这样才能事半功倍。

还有就是针对性。《9分烤鸭阅读》里收录的题目并不是一味地求新,我在收录真题的过程中,综合考虑了测试的题型、文章的背景、题目的难度和对将来考试的针对性。

有不少烤鸭希望用该书来“押题”，这并不是我要推崇的。虽然我在挑选文章时，确实选择了一些在将来的雅思考试中重考几率较大的文章，但我并不推荐烤鸭用《9分烤鸭阅读》去“押题”。因为该书收录的真题数量毕竟是有限的，不能保证何时在考试中重现，所以“押题”并不科学。科学的方法是更有效地学习和利用本书，做到“以不变应万变”，即“以无剑胜有剑”。

此外，我再说一下对《9分烤鸭阅读》的使用方法。建议烤鸭们对该书的每套题都能做三遍。第一遍每套题限时（1个小时）做完，然后对照“题目详解”板块，把每道题都弄明白。要求都达到 explain 的水平，也就是每道题不用再看详解，自己能解释清楚。注意不是自己感觉懂了，而是要能够每道题都解释清楚！第二遍不是做题，而是要求烤鸭们把每道题的中心词划出来，结合“词汇详解”板块，把每道题在原文的同义替换找到，并记下来。第二遍要达到只看题目的中心词，就能把原文对应的语言重现回忆出来。这样就强化训练了烤鸭们对雅思阅读的“题感”，请重视！第三遍也不是做题，而是更高的要求。希望雅思阅读能突破7分，甚至挑战极限追求9分的烤鸭们需要强化这一遍的训练，就是精读文章。这里的精读不是去翻译文章，而是精读文章的结构和句间衔接。在做第三遍时，可以结合“参考译文”，关键是理解原文句间衔接的方法和手段，也就是原文句子与句子之间是如何衔接的。第三遍的要求是：烤鸭们在原文的句与句间具体写出自己分析出的衔接方法，真正地精读文章。然后再分析全文的结构和框架。烤鸭们需要理解的是，英文是“形合”的语言，如果做了这样的精读，也就是向“高级阅读”迈进了扎实的一步，阅读成功指日可待。

最后，我衷心祝愿《9分烤鸭阅读》能帮助烤鸭们屠鸭成功，考到满意的雅思成绩，早日实现自己留学的梦想！

陶春

2016年9月

使用说明

Test 1

READING PASSAGE 1

You should spend about 20 minutes on Questions 1-13, which are based on Reading Passage 1 below.

The Nature of Yawning

- A While fatigue, drowsiness or boredom easily bring on yawns, scientists are discovering there is more to yawning than most people think. Not much is known about why we yawn, so if it serves any useful function. People have already learned that yawning can be infectious. "Contagious yawning" is the increase in likelihood that you will yawn after watching or hearing someone else yawn, but not much is known about the underlying causes, and very little research has been done on the subject. However, scientists at the University of Albany, as well as the University of Leeds and the University of London have done some exploration.
- B It is commonly believed that people yawn as a result of being sleepy or tired because they need oxygen. However, the latest research shows that a yawn can help cool the brain and help it work more effectively, which is quite different from the popular belief that yawning promotes sleep and is a sign of tiredness. Dr. Andrew Gallup and his colleagues at the University of Albany in New York State said their experiments on 44 students showed that raising or lowering oxygen and carbon dioxide levels in the blood did not produce that reaction. In their study participants were shown videos of people laughing and yawning, and researchers counted how many times the volunteers yawned as the "contagious yawn". The researchers found that those who breathed through the nose rather than the mouth were less likely to yawn when watching a video of other people yawning. The same effect was found among those who held a cool pack to their forehead, whereas those who held a warm pack yawned while watching the video. Since yawning occurs when brain temperature rises, sending cool blood to the brain serves to maintain the brain levels of neural efficiency.
- C Yawning is universal to humans and many animals. Cats, dogs and fish yawn just like humans do, but they yawn spontaneously. Only humans and chimpanzees, our closest relatives in the animal kingdom, have shown definite contagious yawning. Though much of yawning is due to suggestibility, sometimes people do not need to actually see

收录近期的
考试真题，每篇
文章标注具体的
考试日期

Questions 1-5

Read paragraphs A-F. Which paragraph contains the following information?

NB You may use any letter more than once.

- 1 Humans' imaginations can cause yawning.
- 2 Research shows that yawning is closely related to occupations.
- 3 An overview of the latest research in yawning.
- 4 Yawning is used to regulate brain temperature.
- 5 Scientists discovered some evidence disproving the early understanding of yawning.

Questions 6-9

Match each of the following research results with the university which it comes from.

NB You may use any letter more than once.

- A University of Albany
- B University of Leeds
- C University of London

- 6 There is no gender difference in the causes of yawning.
- 7 People with certain disorders are less likely to be affected by other people yawning.
- 8 Yawning is associated with the way people breathe.
- 9 People who are trained to feel empathy for others are more likely to yawn than those who are untrained.

分档训练

按难度等级分类

Questions 10-13

Complete the summary below.

Choose **ONE WORD** from the passage for each answer.

Write your answers on lines 10-13 on your answer sheet.

Another theory shows that yawning is used for 10 individuals into a tighter social unit. Alternatively, yawning can help increase alertness of group members in case 11 is close. For example, yawning signals that a member of the group needs some 12 and requires the others to stay aware of the surrounding situation. This theory proves that yawning is only a spontaneous behaviour resulting from some part of a simple 13 system in early humans.

与题库里的真题一
模一样，应认真研读并
彻底掌握

需要对每篇阅读文章进行精读，熟知常用的文章结构，熟记重点词汇和句型

词汇详解

① 雅思阅读中经常考查同义词，需要重点掌握

② 常见的派生词及衍生词，需熟记

③ 常见的词组或常用搭配，需熟记

④ 雅思阅读中的高频词，需要掌握其英文释义、可替换的同义词及相关搭配等

题目详解

提供详尽的题目解析，帮助考生从根本上把握出题规律和答题技巧与方法

参考译文

提供流畅精准的中文译文，帮助考生全面、深入理解原文

2

Test 2

READING PASSAGE 1 Bondi Beach

corruption > 说辞，借口，明高
 指 academic corruption 学术腐败

nulla > (意大利或土著人使用的) 木牌

aboriginal > 土著的，原始的

indigenous > 土著的，土生的

room > 房间，寝室
 指 virtual room 虚拟房间

unequivocal > 明确的，不含糊的

derive > 源于，允许，派
 指 derive from 起源于

grant > 授予，允许，派
 指 grant a licence 颁发执照

purchase > 购买，购置
 指 online purchase 网上购买

residential > 住宅的，与居民
 指 residential care 住宅护理

available > 可得到的，有
 指 available to 可供

● **corruption**
 > 说辞，借口
 指 academic corruption 学术腐败

● **aboriginal**
 > 土著的，原始的

● **indigenous**
 > 土著的，土生的

● **room**
 > 房间，寝室
 指 virtual room 虚拟房间

● **unequivocal**
 > 明确的，不含糊的

● **derive**
 > 源于，允许，派
 指 derive from 起源于

● **grant**
 > 授予，允许，派
 指 grant a licence 颁发执照

● **purchase**
 > 购买，购置
 指 online purchase 网上购买

● **residential**
 > 住宅的，与居民
 指 residential care 住宅护理

● **available**
 > 可得到的，有
 指 available to 可供

Questions 1-5

1. 题目问的是“人们从澳大利亚哪里去‘岩石海滩’”，根据原文第二段 rock carving 定位到第二段第一句：“Before European settlement, these were numerous scattered lightings during the early colonial period and there are significant aboriginal rock carvings.”在澳洲人建立殖民地之前，土著便在乌鲁鲁岩壁上雕刻岩画，与早期欧洲人相比，这些岩画数量更多的从属部落，与后来澳大利亚土著部落相比，所以澳大利亚的岩画雕刻的分布更广泛，答案选 F。G。I。

2. 题目问的是“岩石海滩的公共集会”，根据题目的关键词 public gathering area 定位到第三段第二句：“Between 1863 and 1887, made the beach and the surrounding land available to the public as a picnic ground and amusements area.”(在 1863 年至 1887 年间，……)由此可知“岩石海滩”是公共集会场所，所以为公共集会场所的地点，由此可知它是在公共集会场所的地点，答案选 F。G。I。

3. 题目问的是“在 19 世纪初期，澳大利亚有怎样的公共集会”，根据原文第二段“The early 1800s, the area around the rock was used as a picnic ground and amusements area.”可知在 19 世纪初期，澳大利亚有公共集会场所和娱乐场所，所以答案选 F。G。I。

4. 题目的意思是“英国皇家海军在 19 世纪中期建造了公共集会场所”，根据原文第二段“Between 1863 and 1887, made the beach and the surrounding land available to the public as a picnic ground and amusements area.”(在 1863 年至 1887 年间，……)由此可知“岩石海滩”是公共集会场所，所以为公共集会场所的地点，由此可知它是在公共集会场所的地点，答案选 F。G。I。

5. 题目的意思是“在 19 世纪初期，澳大利亚有怎样的公共集会”，根据原文第二段“The early 1800s, the area around the rock was used as a picnic ground and amusements area.”可知在 19 世纪初期，澳大利亚有公共集会场所和娱乐场所，所以答案选 F。G。I。

Answer Keys

Test 1

Each question correctly answered scores 1 mark. CORRECT SPELLING IS NEEDED IN ALL ANSWERS.

Reading Passage 1

1 A
2 C
3 D
4 A
5 B

Reading Passage 2

14 FALSE
15 TRUE
16 NOT GIVEN
17 sludge
18 need
19 gravel
20 H

Reading Passage 3

17 TRUE
18 TRUE
19 FALSE
20 NOT GIVEN
21 TRUE
22 NOT GIVEN
23 usually
24 into/getta porch
25 had pipe
26 impedance
27 James Bachman
28 sandy
29 tropical rain
30 several hours

If you score ...

0-12	13-20	21-40
you are highly unlikely to get an acceptable score under examination conditions but we recommend that you spend a lot of time improving your English before you take IELTS.	you may get an acceptable score under examination conditions but we recommend that you think about having more practice or lessons before you take IELTS.	you are likely to get an acceptable score under examination conditions but remember that different institutions will find different scores acceptable.

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《9分烤鸭阅读》收录文章及考试时间一览表

TEST 1

The Nature of Yawning 2016.4.16/2015.8.8/2010.10.9

Water Treatment 2: Reed Bed 2016.4.2/2015.2.7/2009.10.10

History of the Telegraph in Communications 2016.1.9

TEST 2

Bondi Beach 2015.1.10/2011.2.19

Follow Your Nose 2015.8.1/2009.4.18

Architecture in Britain 2015.11.21/2010.5.29

TEST 3

Bovids 2015.1.29/2011.4.16

The Contribution of Language to Business 2014.9.20/2011.8.27

Agriculture and Tourism 2014.4.24/2011.2.26

TEST 4

The Pearl 2014.2.15/2008.4.5

Gesture 2015.7.11/2010.2.11

Grimm's Fairy Tales 2015.7.4/2014.3.13

TEST 5

The "Extinct" Grass in Britain 2015.9.12/2010.8.28

The Cultures of Chimpanzees 2015.6.18/2011.11.19

Personality and Appearance 2015.6.18

TEST 6

The History of Tea 2015.8.8/2008.11.15

How Do We Find Our Way? 2015.7.23/2010.5.29

What is meaning? 2015.8.1/2012.5.12



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Test 1

READING PASSAGE 1

You should spend about 20 minutes on Questions 1–13, which are based on Reading Passage 1 below.

The Nature of Yawning



- A** While fatigue, drowsiness or boredom easily bring on yawns, scientists are discovering there is more to yawning than most people think. Not much is known about why we yawn or if it serves any useful function. People have already learned that yawning can be infectious. “Contagious yawning” is the increase in likelihood that you will yawn after watching or hearing someone else yawn, but not much is known about the underlying causes, and very little research has been done on the subject. However, scientists at the University of Albany, as well as the University of Leeds and the University of London have done some exploration.
- B** It is commonly believed that people yawn as a result of being sleepy or tired because they need oxygen. However, the latest research shows that a yawn can help cool the brain and help it work more effectively, which is quite different from the popular belief that yawning promotes sleep and is a sign of tiredness. Dr. Andrew Gallup and his colleagues at the University of Albany in New York State said their experiments on 44 students showed that raising or lowering oxygen and carbon dioxide levels in the blood did not produce that reaction. In the study participants were shown videos of people laughing and yawning, and researchers counted how many times the volunteers responded to the “contagious yawns”. The researchers found that those who breathed through the nose rather than the mouth were less likely to yawn when watching a video of other people yawning. The same effect was found among those who held a cool pack to their forehead, whereas those who held a warm pack yawned while watching the video. Since yawning occurs when brain temperature rises, sending cool blood to the brain serves to maintain the best levels of mental efficiency.
- C** Yawning is universal to humans and many animals. Cats, dogs and fish yawn just like humans do, but they yawn spontaneously. Only humans and chimpanzees, our closest relatives in the animal kingdom, have shown definite contagious yawning. Though much of yawning is due to suggestibility, sometimes people do not need to actually see

a person yawn to involuntarily yawn themselves: hearing someone yawning or even reading about yawning can cause the same reaction.

- D** However, contagious yawning goes beyond mere suggestibility. Recent studies show that contagious yawning is also related to our predisposition toward empathy—the ability to understand and connect with others’ emotional states. So empathy is important, sure, but how could it possibly be related to contagious yawning? Leave it up to psychologists at Leeds University in England to answer that. In their study, researchers selected 40 psychology students and 40 engineering students. Generally, psychology students are more likely to feel empathy for others, while engineering students are thought to be concerned with objects and science. Each student was made to wait individually in a waiting room, along with an undercover assistant who yawned 10 times in as many minutes. The students were then administered an emotional quotient test: students were shown 40 images of eyes and asked what emotion each one displayed. The results of the test support the idea that contagious yawning is linked to empathy. The psychology students—whose future profession requires them to focus on others—yawned contagiously an average of 5.5 times in the waiting room and scored 28 out of 40 on the emotional test. The engineering students—who tend to focus on things like numbers and systems—yawned an average of 1.5 times and scored 25.5 out of 40 on the subsequent test. The difference doesn’t sound like much, but researchers consider it significant. Strangely enough, women, who are generally considered more emotionally attuned, didn’t score any higher than men.
- E** Another study, led by Atsushi Senju, a cognitive researcher at the University of London, also sought to answer that question. People with autism disorder are considered to be developmentally impaired emotionally. Autistics have trouble connecting with others and find it difficult to feel empathy. Since autistics have difficulty feeling empathy, then they shouldn’t be susceptible to contagious yawning. To find out, Senju and his colleagues placed 49 kids aged 7 to 15 in a room with a television. 24 of the test subjects had been diagnosed with autism spectrum disorder, the other 25 were non-autistic kids. The test subjects were shown short clips of people yawning as well as clips of people opening their mouths but not yawning. While the kids with autism had the same lack of reaction to both kinds of clips, the non-autistic kids yawned more after the clips of people yawning.
- F** There also have been studies that suggest yawning, especially psychological “contagious” yawning, may have developed as a way of keeping a group of animals alert and bonding members of a group into a more unit one. If an animal is drowsy or bored, it may not be as alert as it should be prepared to spring into action and its yawning is practically saying, “Hey, I need some rest, you stay awake”. Therefore, a contagious yawn could be an instinctual reaction to a signal from one member of the herd reminding the others to stay alert when danger comes. So the theory suggests evidence that yawning comes from the evolution of early humans to be ready to physically exert themselves at any given moment.

Questions 1–5

Read paragraphs A–F. Which paragraph contains the following information?

NB You may use any letter more than once.

- 1 Humans' imaginations can cause yawning.
- 2 Research shows that yawning is closely related to occupations.
- 3 An overview of the latest research in yawning.
- 4 Yawning is used to regulate brain temperature.
- 5 Scientists discovered some evidence disproving the early understanding of yawning.

Questions 6–9

Match each of the following research results with the university which it comes from.

NB You may use any letter more than once.

- A University of Albany
- B University of Leeds
- C University of London

- 6 There is no gender difference in the cause of yawning.
- 7 People with certain disorders are less likely to be affected by other people yawning.
- 8 Yawning is associated with the way people breathe.
- 9 People who are trained to feel empathy for others are more likely to yawn than those who are untrained.



Questions 10–13

Complete the summary below.

*Choose **ONE WORD** from the passage for each answer.*

Write your answers in boxes 10–13 on your answer sheet.

Another theory shows that yawning is used for **10** individuals into a tighter social unit. Alternatively, yawning can help increase alertness of group members in case **11** is close. For example, yawning signals that a member of the group needs some **12** and requires the others to stay aware of the surrounding situation. This theory proves that yawning is only a spontaneous behaviour resulting from some part of a simple **13** system in early humans.

READING PASSAGE 2

You should spend about 20 minutes on Questions 14–26, which are based on Reading Passage 2 below.

Water Treatment 2: Reed Bed



In recent years, it has been shown that plants, more accurately roots, play a crucial part in purifying dirty water before it enters seas and rivers. In 15th-century Britain, dirty water was purified by passing through the wetlands. People began to realize that the “natural” way of water purification was effective. Nowadays subsurface flow wetlands (SSFW) are a common alternative in Europe for the treatment of wastewater in rural areas. Mainly in the last 10 to 12 years there has been a significant growth in the number and size of the systems in use. The conventional mechanism of water purification used in big cities where there are large volumes of water to be purified is inappropriate in rural areas.

The common reed has the ability to transfer oxygen from its leaves, down through its stem and rhizomes, and out via its root system. As a result of this action, a very high population of microorganisms occurs in the root system, in zones of aerobic, anoxic, and anaerobic conditions. As the waste water moves very slowly through the mass of reed roots, this liquid can be successfully treated. The reason why they are so effective is often because within the bed’s root sector, natural biological, physical and chemical processes interact with one another to degrade or remove a good range of pollutants.

Dirty water from households, farms and factories consume a lot of oxygen in the water, which will lead to the death of aquatic creatures. Several aquatic plants are important in purifying water. They not only absorb carbon dioxide and release oxygen into the water, improving the environment for fish, but absorb nutrients from the water as well. Britain and the U.S. differ in their preference of plants to purify water. Bulrushes (*Scirpus* spp.) and rushes (*Juncus* spp.) are excellent water purifiers. They remove excess nutrients from the water as well as oil and bacteria such as *Escherichia coli* and *Salmonella*. However, algae grow freely in summer and die off in winter. Their remains foul the bottom of the pool.

Artificial reed beds purify water in both horizontal and downflow ways. The reeds succeed best when a dense layer of root hairs has formed. It takes three years for the roots to fully develop. Which type of wetland a certain country applies varies widely depending on the country in Europe and its main lines of development. Besides the development of horizontal or vertical flow wetlands for wastewater treatment, the use of wetlands for sludge treatment has been very successful in

Europe. Some special design lines offer the retention of microbiological organisms in constructed wetlands, the treatment of agricultural wastewater, treatment of some kinds of industrial wastewater, and the control of diffuse pollution.

If the water is slightly polluted, a horizontal system is used. Horizontal-flow wetlands may be of two types: free-water surface-flow (FWF) or sub-surface water-flow (SSF). In the former the effluent flows freely above the sand/gravel bed in which the reeds etc. are planted; in the latter effluent passes through the sand/gravel bed. In FWF-type wetlands, effluent is treated by plant stems, leaves and rhizomes. Such FWF wetlands are densely planted and typically have water-depths of less than 0.4m. However, dense planting can limit the diffusion of oxygen into the water. These systems work particularly well for low strength effluents or effluents that have undergone some forms of pretreatment and play an invaluable role in tertiary treatment and the polishing of effluents. The horizontal reed flow system uses a long reed bed, where the liquid slowly flows horizontally through. The length of the reed bed is about 100 meters. The downside of horizontal reed beds is that they use up lots of land space and they do take quite a long time to produce clean water.

A vertical flow (downflow) reed bed is a sealed, gravel filled trench with reeds growing in it. The reeds in a downflow system are planted in a bed 60cm deep. In vertical flow reed beds, the wastewater is applied to the top of the reed bed, flows down through a rhizome zone with sludge as a substrate, then through a root zone with sand as a substrate, followed by a layer of gravel for drainage, and is collected in an under drainage system of large stones. The effluent flows onto the surface of the bed and percolates slowly through the different layers into an outlet pipe, which leads to a horizontal flow bed where it is cleaned by millions of bacteria, algae, fungi, and microorganisms that digest the waste, including sewage. There is no standing water so there should be no unpleasant smells.

Vertical flow reed bed systems are much more effective than horizontal flow reed-beds not only in reducing biochemical oxygen demanded (BOD) and suspended solids (SS) levels but also in reducing ammonia levels and eliminating smells. Usually considerably smaller than horizontal flow beds, they are capable of handling much stronger effluents which contain heavily polluted matters and have a longer lifetime value. A vertical reed bed system works more efficiently than a horizontal reed bed system, but it requires more management, and its reed beds are often operated for a few days then rested, so several beds and a distribution system are needed.

The natural way of water purification has many advantages over the conventional mechanism. The natural way requires less expenditure for installation, operation and maintenance. Besides, it looks attractive and can improve the surrounding landscape. Reed beds are natural habitats found in floodplains, waterlogged depressions and estuaries. The natural bed systems are a biologically proved, an environmentally friendly and visually unobtrusive way of treating wastewater, and have the extra virtue of frequently being better than mechanical wastewater treatment systems. Over the medium to long term reed bed systems are, in most cases, more cost effective to install than any other wastewater treatment. They are naturally environmentally sound protecting groundwater, dams, creeks, rivers and estuaries.