



# Toilet paper

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**Toilet paper** is a tissue paper product primarily used for wiping and cleaning the anus and surrounding area of fecal material after defecation and by human females for cleaning the perineal area of urine after urination and other bodily fluid releases. It also acts as a layer of protection for the hands during these processes. It is sold as a long strip of perforated paper wrapped around a paperboard core for storage in a dispenser by a toilet. Most modern toilet paper in the developed world is designed to decompose in septic tanks, whereas some other bathroom and facial tissues are not. Toilet paper comes in one-ply all the way up to six-ply, meaning that it is either a single sheet or multiple sheets placed back-to-back to make it thicker, softer, stronger and more absorbent.

The use of paper for hygiene purposes has been recorded in China in the 6th century AD, with specifically manufactured toilet paper being mass-produced in the 14th century.<sup>[1]</sup> Modern commercial toilet paper originated in the 19th century, with a patent for roll-based dispensers being made in 1883.



A roll of toilet paper.



Toilet paper and toilet paper holder.

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## History

Although paper had been known as a wrapping and padding material in China since the 2nd century BC,<sup>[2]</sup> the first documented use of toilet paper in human history dates back to the 6th century AD, in early medieval China.<sup>[1]</sup> In 589 AD the scholar-official Yan Zhitui (531–591) wrote about the use of toilet paper:

"Paper on which there are quotations or commentaries from the Five Classics or the names of sages, I dare not use for toilet purposes".<sup>[1]</sup>

During the later Tang dynasty (618–907 AD), an Arab traveller to China in the year 851 AD remarked:

"...they [the Chinese] do not wash themselves with water when they have done their necessities; but they only wipe themselves with paper."<sup>[1]</sup>

During the early 14th century, it was recorded that in modern-day Zhejiang province alone there was an annual manufacturing of toilet paper amounting in ten million packages of 1,000 to 10,000 sheets of toilet paper each.<sup>[1]</sup> During the Ming dynasty (1368–1644 AD), it was recorded in 1393 that an annual supply of 720,000 sheets of toilet paper (two by three feet in size) were produced for the general use of the imperial court at the capital of Nanjing.<sup>[1]</sup> From the records of the Imperial Bureau of Supplies of that same year, it was also recorded that for the Hongwu Emperor's imperial family alone, there were 15,000 sheets of special soft-fabric toilet paper made, and each sheet of toilet paper was even perfumed.<sup>[1]</sup>

Elsewhere, wealthy people wiped themselves with wool, lace or hemp, while less wealthy people used their hand when defecating into rivers, or cleaned themselves with various materials such as rags, wood shavings, leaves, grass, hay, stone, sand, moss, water, snow, maize, ferns, many plant husks, fruit skins, or seashells, and corncobs, depending upon the country and weather conditions or social customs. In Ancient Rome, a sponge on a stick was commonly used, and, after use, placed back in a pail of vinegar. Several talmudic sources indicating ancient Jewish practice refer to the use of small pebbles, often carried in a special bag, and also to the use of dry grass and of the smooth edges of broken pottery jugs (e.g., Shabbat 81a, 82a, Yevamot 59b). These are all cited in the classic *Biblical and Talmudic Medicine* by the German physician Julius Preuss (Eng. trans. Sanhedrin Press, 1978).

The 16th-century French satirical writer François Rabelais, in Chapter XIII of Book 1 of his novel-sequence *Gargantua and Pantagruel*, has his character Gargantua investigate a great number of ways of cleansing oneself after defecating. Gargantua dismisses the use of paper as ineffective, rhyming that: "Who his foul tail with paper wipes, Shall at his ballocks leave some chips." (Sir Thomas Urquhart's 1653 English translation). He concludes that "the neck of a goose, that is well downed" provides an optimum cleansing medium.<sup>[3]</sup>

The rise of publishing by the eighteenth century led to the use of newspapers and cheap editions of popular books for cleansing. Lord Chesterfield, in a letter to his son in 1747, told of a man who purchased



Anal cleansing instruments known as *chūgi* from the Nara period (710 to 784) in Japan. The modern rolls in the background are for size comparison.

"a common edition of Horace, of which he tore off gradually a couple of pages, carried them with him to that necessary place, read them first, and then sent them down as a sacrifice to Cloacina; thus was so much time fairly gained ...".<sup>[4]</sup>

In many parts of the world, especially where toilet paper or the necessary plumbing for disposal may be unavailable or unaffordable, toilet paper is not used. Also, in many parts of the world such as India, people consider using water a much cleaner and more sanitary practice than using paper.<sup>[5]</sup> Cleansing is then performed with other methods or materials, such as water, for example using a bidet, a lota, rags, sand, leaves (including seaweed), corn cobs, animal furs, sticks or hands; afterwards, hands are washed with soap.

## As a commodity



"Le Troubadour" (French) - 1960s package of toilet paper

Joseph Gayetty is widely credited with being the inventor of modern commercially available toilet paper in the United States. Gayetty's paper, first introduced in 1857, was available as late as the 1920s. Gayetty's Medicated Paper was sold in packages of flat sheets, watermarked with the inventor's name. Original advertisements for the product used the tagline "The greatest necessity of the age! Gayetty's medicated paper for the water-closet."

Seth Wheeler of Albany, New York, obtained the earliest United States patents for toilet paper and dispensers, the types of which eventually were in common use in that country, in 1883.<sup>[6]</sup>

Moist toilet paper, called wet wipes, was first introduced in the United Kingdom by Andrex in the 1990s, and in the United States by Kimberly-Clark in 2001. It has been promoted as being a better method of cleaning than dry toilet paper after defecation, and may be useful for women during menstruation. It was promoted as a flushable product but it has been implicated in the creation of fatbergs. By 2016, some municipalities had begun education campaigns advising people not to flush used wet wipes.<sup>[7]</sup>

More than seven billion rolls of toilet paper are sold yearly in the U.S. alone. Americans use an average of 23.6 rolls per capita per year.<sup>[8]</sup>

## Description

Toilet paper is available in several types of paper, a variety of patterns, decorations, and textures, and it may be moistened or perfumed, although fragrances sometimes cause problems for users who are allergic to perfumes. The average measures of a modern roll of toilet paper is ~10 cm (3 15/16 in.) wide,  $\varnothing$  12 cm (4 23/32 in.) and weighs about 227 grams (8 oz.).<sup>[9]</sup> An alternative method of packing the sheets uses interleaved sheets in boxes, or in bulk for use in dispensers. 'Hard' single ply paper has been used as well as soft multi-ply.



A print by William Hogarth entitled *A Just View of the British Stage* from 1724 depicting Robert Wilks, Colley Cibber, and Barton Booth rehearsing a pantomime play with puppets enacting a prison break down a privy. The "play" is composed of nothing but toilet paper, and the scripts for *Hamlet*, *inter al.*, are toilet paper.

## Size

Manufactured toilet paper sheet in the United States was sized 4 1/2" x 4 1/2".<sup>[10]</sup> Since 1999 the size of a sheet has been shrinking; Kimberly-Clark reduced the length of a sheet to 4.1".<sup>[11]</sup> Scott, in 2006, reduced the length of their product to 3.7". The width of sheets was later reduced giving a general sheet size of 3.7" long and 4.1" wide. Larger sizes remain available. This variability in size has resulted in some issues with toilet paper dispensers.

## Materials

Toilet paper products vary greatly in the distinguishing technical factors, such as size, weight, roughness, softness, chemical residues, "finger-breakthrough" resistance, water-absorption, etc. The larger companies have very detailed, scientific market surveys to determine which marketing sectors require or demand which of the many technical qualities. Modern toilet paper may have a light coating of aloe or lotion or wax worked into the paper to reduce roughness.

Quality is usually determined by the number of plies (stacked sheets), coarseness, and durability. Low grade institutional toilet paper is typically of the lowest grade of paper, has only one or two plies, is very coarse and sometimes contains small amounts of embedded unbleached/unpulped paper.<sup>[12]</sup> Mid-grade two ply is somewhat textured to provide some softness and is somewhat stronger. Premium toilet paper may have lotion and wax and has two to four plies of very finely pulped paper. If it is marketed as "luxury", it may be quilted or rippled (embossed), perfumed, colored or patterned, medicated (with anti-bacterial chemicals), or treated with aloe or other perfumes.

In order to advance decomposition of the paper in septic tanks or drainage, the paper used has shorter fibres than facial tissue or writing paper. The manufacturer tries to reach an optimal balance between rapid decomposition (which requires shorter fibres) and sturdiness (which requires longer fibres). Compaction of toilet paper in drain lines, such as in a clog, prevents fiber dispersion and largely halts the breakdown process.

A German quip says that the toilet paper of Nazi Germany was so rough and scratchy that it was almost unusable, so many people used old issues of the *Völkischer Beobachter* instead, because the paper was softer.<sup>[13]</sup>

## Color and design

Colored toilet paper in colors such as pink, lavender, light blue, light green, purple, green, and light yellow (so that one could choose a color of toilet paper that matched or complemented the color of one's bathroom) was commonly sold in the United States from the 1960s. Up until 2004, Scott was one of the last remaining U.S. manufacturers to still produce toilet paper in beige, blue, and pink. However, the company has since cut production of colored paper altogether.

Today, in the United States, plain unpatterned colored toilet paper has been mostly replaced by patterned toilet paper, normally white, with embossed decorative patterns or designs in various colors and different sizes depending on the brand. Colored toilet paper remains commonly available in some European countries.

An unintended problem with the design of the laminated construction of the sheets in a roll is that, on occasion whilst un-rolling, separation occurs between laminations rather than at the intended interface. Perforations then become misaligned and sheets cannot be torn off cleanly. The problem is resolved by careful un-winding of one or more laminations until the perforations re-align.

## Installation

### Dispensers

A toilet roll holder, also known as a toilet paper dispenser, is an item that holds a roll of toilet paper. There are at least seven types of holders:

1. A horizontal piece of wire mounted on a hinge, hanging from a door or wall.
2. A horizontal axle recessed in the wall.
3. A vertical axle recessed in the wall
4. A horizontal axle mounted on a freestanding frame.
5. A freestanding vertical pole on a base.
6. A wall mounted dispensing unit, usually containing more than one roll. This is used in the commercial / away-from-home marketplace.
7. A wall mounted dispensing unit with tissue interfolded in a "S" type leave so the user can extract the tissue one sheet at a time.

Some commercial or institutional toilet paper is wrapped around a cylinder to many times the thickness of a standard toilet paper roll.

### Orientation

There are two choices of orientation when using a holder with a horizontal axle parallel to the wall: the toilet paper may hang *over* or *under* the roll. The choice is largely a matter of personal preference, dictated by habit. In surveys of American consumers and of bath and kitchen specialists, 60-70% of respondents prefer *over*.

### Decoration

*Toilegami* refers to toilet paper origami. Like table napkins, some fancy Japanese hotels fold the first squares of toilet paper on its dispenser to be presented in a fashionable way.<sup>[14]</sup>

### Recreational use

Toilet paper has been the primary tool in a prank known as "TP-ing" (pronounced Teepeeing). TP-ing, or "toilet papering", is often favored by adolescents and teenagers and is the act of throwing rolls of toilet paper over cars, trees, houses and gardens, causing the toilet paper to unfurl and cover the property, creating an inconvenient mess.<sup>[15]</sup>

Another popular activity is called "spitballing" or "wet TP-ing". This involves wadding up a handful of toilet paper, soaking it in water or any other liquid and throwing it at a target, usually the ceiling. The wad of toilet paper is usually adhesive due to its moist state, which causes it to stick to the target for maximum inconvenience.

## Mechanics



Toilet paper is also used for spreading on seat before sitting

Alexander Balankin and coauthors have studied the behavior of toilet paper under tensile stress<sup>[16][17]</sup> and during wetting and burning.<sup>[18]</sup>

Toilet paper has been used in physics education to demonstrate the concepts of torque, moment of inertia, and angular momentum;<sup>[19][20][21]</sup> and the conservation of momentum and energy.<sup>[22]</sup>

## Usage

### Environmental considerations

One tree produces about 100 pounds (45 kg) of toilet paper and about 83 million rolls are produced per day.<sup>[9]</sup> Global toilet paper production consumes 27,000 trees daily.<sup>[23]</sup>

More than seven billion rolls of toilet paper are sold yearly in the United States alone. Americans use an average of 23.6 rolls per capita a year. The average American uses 50 pounds (23 kg) of tissue paper per year which is 50% more than the average of other Western countries or Japan.<sup>[24]</sup> The higher use in the United States may be explained by the fact that other countries people use bidets or spray hoses to clean themselves.<sup>[25]</sup> Millions of trees are harvested in North and South America leaving ecological footprint concerns.<sup>[26]</sup> Citizens of many Western countries sometimes use toilet paper for industrial purposes such as oil filters,<sup>[27]</sup> which may distort the use statistics.

As of 2009, between 22% and 48% of the toilet paper used in the United States comes from tree farms in the U.S. and South America, with most of the rest coming from second growth forests, and only a small percentage coming from virgin forests.<sup>[8]</sup>

## See also

- Anal cleansing, or "wiping"
- Handle-o-Meter
- Minimello- a Swedish talent show for toilet rolls

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## Further reading

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## External links

- The Whole World Toilet Paper Museum (http://www.tagyerit.com/tp/index.html)



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