



Manzanares basin  
Manzanares el Real reservoir

## Manzanares el Real reservoir

The Manzanares el Real reservoir, located on the Manzanares river, takes its name from the municipality closest to it. Built in 1971, it heightened the previous Santillana reservoir and flooded the existing dam, which had been built between 1906 and 1920. By increasing the height by a mere five metres, the storage capacity was doubled. The top of its neogothic tower and the crest of the old levee can currently be seen.

The new Manzanares el Real dam is of type with an upstream asphalt facing. It is of mixed shape, formed by two straight lines joined by an arch with a radius of 130 metres, a typology that was ground-breaking in Spain.

The reservoir has a surface of almost eleven square kilometres. Although the original dam divides the reservoir into two unequal parts (the one downstream is smaller, known as 'interdam space'), both areas are currently permanently connected through the notches in the original dam.



Capacity  
91.2 hm<sup>3</sup>

Surface  
1,052 ha

Type  
Rockfill dam with  
a mixed-shape asphalt  
facing

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## Reservoir

Capacity:	91.2 hm <sup>3</sup>
Average flow:	110 hm <sup>3</sup> /year
Basin surface:	244 km <sup>2</sup>
Maximum reservoir surface:	1,052 ha
Length of banks:	30 km
Length of river at the reservoir:	5 km



## Dam

Classification:	type A
Type:	rock-fill with asphalt facing. Mixed shape
Height above foundations:	40 m
Crest length:	1,355 m
Crest width:	7 m
Face slope:	upstream: 1.75 downstream: 1.40
Volume of masonry:	740,000 m <sup>3</sup> rock-fill 110,000 m <sup>3</sup> concrete
Galleries:	perimeter

## Operating elements

### Spillway

Number of spans:	2
Total length:	11 m
Operating mechanism:	sector gate height: 5.10 m
Spilling capacity:	240 m <sup>3</sup> /s

### Outlets

Location:	bottom + intermediate
Number of ducts:	2 + 2*
Operating mechanism:	upstream: gate valves downstream: hollow jet valves
Dimensiones:	upstream: Ø 50 cm 125 x 150* cm downstream: Ø 50 cm Ø 140* cm
Total dewatering capacity:	35 m <sup>3</sup> /s*

\* Data for the middle outlet.

## Monitoring elements

- 4 rod extensometers
- 8 piezometers
- 138 topographical bases for levelling and collimation
- 3 points of area gauging

## Automated monitoring elements

- Reservoir point gauge
- Thermometer
- Rain gauge
- 3 liquid level gauges
- 4 extensometers
- 8 piezometers
- 4 3D sismographs

 See tapping PDF

 See tapping video

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