

New ARR Probability Terminology

The new edition of Australian Rainfall and Runoff (ARR) will adopt probability terminology that differs from that used in ARR87. The adopted terminology meets the requirements of Engineers Australia’s National Committee on Water Engineering that it provide:

- Clarity of meaning
- Technical correctness
- Practicality and acceptability

The new terminology, which has been adopted for the new IFDs, is presented in Table 1. It can be summarised as follows:

- The term Annual Exceedance Probability (AEP) will be used for design events (rainfalls and floods) including and rarer (less frequent) than those with a 10% AEP.
- AEPs are to be expressed as an exceedance probability using percentage probability; for example a design rainfall will be described as having a 1% AEP.
- Events that are more frequent than those with a 50% AEP will be expressed as X Exceedances per Year (EY). For example, a design event (rainfall or flood) with a 6 month recurrence interval will be expressed as having 2 Exceedances per Year (2EY).
- The use of Average Recurrence Interval (ARI) is discouraged as it is problematic for frequent events in seasonal climates and leads to confusion with the public for rare events.

PLEASE NOTE:

The terminology to be adopted for events with probabilities between 1 EY and 10% AEP is still being finalised. For this release, the design rainfalls provided within this probability range are those with a 50% AEP and those with a 20% AEP. Users will be notified of any change in this terminology and the associated design rainfalls as and when the terminology is finalised.

Table 1. EY, AEP, ARI preferred usage

EY	AEP (%)	AEP (1 in x)	ARI	Uses in Engineering Design
6	99.75	1.002	0.17	Water sensitive urban design
4	98.17	1.02	0.25	
3	95.02	1.05	0.33	
2	86.47	1.16	0.50	
1	63.21	1.58	1.00	
0.69	50.00 ¹	2	1.44	Stormwater/pit and pipe design
0.5	39.35	2.54	2.00	
0.22	20.00 ¹	5	4.48	
0.2	18.13	5.52	5.00	
0.11	10.00	10	9.49	Floodplain management and
0.05	5.00	20	19.5	
0.02	2.00	50	49.5	
0.01	1.00	100	100	
0.005	0.50	200	200	

				waterway design
0.002	0.20	500	500	
0.001	0.10	1000	1000	
0.0005	0.05	2000	2000	
0.0002	0.02	5000	5000	Design of critical infrastructure (eg dams)

¹It should be noted that for the 20% and 50% AEP the usual conversion to EY or ARI as simply the inverse of AEP does *not* apply; the corresponding correct EY and ARI values are shown in the table.