

Specification for

# Water cooling towers —

Part 1: Glossary of terms

## Co-operating organizations

The Mechanical Engineering Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

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Board of Trade	Institution of Heating and Ventilating Engineers
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British Electrical and Allied Manufacturers' Association*	Institution of Production Engineers
British Gear Manufacturers' Association	Locomotive and Allied Manufacturers' Association of Great Britain
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British Mechanical Engineering Confederation*	Machine Tool Trades Association
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Gas Council*	Ministry of Transport
	National Coal Board
	National Physical Laboratory (Ministry of Technology)
	Radio Industry Council
	Royal Institute of British Architects
	Institution of Mechanical Engineers

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

Concrete Society	Institution of Structural Engineers
Federation of Civil Engineering Contractors	United Kingdom Atomic Energy Authority
Institution of Chemical Engineers	

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## Foreword

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 5000, fully indexed and with a note of the contents of each, will be found in the British Standards Yearbook, price 20s. The BS Yearbook may be consulted in many public libraries and similar institutions.

This British Standard Glossary has been prepared as part of a series dealing with the thermal design, construction and testing of cooling towers.

It defines general terms used in connection with this subject, and includes specific terms associated with the testing of the thermal performance of cooling towers and used in Part 2 of the standard.

In the preparation of this glossary care has been taken to standardize only suitable terms and definitions, and not to perpetuate unsuitable terms because they have been used in the past. Those terms still in current use, but which are non-preferred, are given after the preferred term in small capital letters.

Consideration has also been given to the C.T.I. Bulletin NCL-109, "Nomenclature for industrial water cooling towers" published by the Cooling Tower Institute (USA) and where appropriate certain definitions have been adopted.

Terms and definitions relating to the thermal and structural design of cooling towers will be incorporated in a future edition of this glossary.

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### Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 4 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

## Glossary

No.	Term	Definition
1	<b>air flow</b>	Total quantity of air including associated water vapour flowing through the tower.
2	<b>ambient wet bulb temperature</b>	Wet bulb temperature of air measured windward of the tower and free from the influence of the tower.
3	<b>approach</b>	Difference between recooled water temperature and nominal inlet air wet bulb temperature.
4	<b>basin kerb</b> POND CILL	Top level of the retaining wall of the cold water basin; usually the datum point from which tower elevation points are measured.
5	<b>cell</b>	Smallest subdivision of a cooling tower bounded by exterior walls and partition walls which can function as an independent unit as regards air and water flow.
6	<b>cell height</b>	The distance from basin kerb to top of fan deck but not including fan stack.
7	<b>cell length</b>	The dimension parallel to longitudinal axis and the plane where louvres are usually placed.
8	<b>cell width</b>	The dimension perpendicular to tower longitudinal axis and usually at right angles to the louvre area.
9	<b>circulating water flow</b>	The quantity of hot water flowing into the tower.
10	<b>cold water basin</b> BASIN POND	A device underlying the tower to receive the cold water from the tower, and direct its flow to the suction line or sump.
11	<b>column anchor</b>	A device for attaching the tower structure to the foundation: it does not include the foundation bolt.
12	<b>concentration</b>	The increase of impurities in the cooling water due to the evaporative process.
13	<b>concentration ratio</b>	Ratio of the impurities in the circulating water and the impurities in the make-up water.
14	<b>cooling range</b> RANGE	Difference between the hot water temperature and the recooled water temperature.
15	<b>discharge stack</b>	That part of the shell or casing of a forced draught tower, through which the outlet air is finally discharged. (See "fan stack" for induced draught towers and "shell" for natural draught towers.)
16	<b>distribution basin</b>	The elevated basin used to distribute hot water over the tower packing.
17	<b>distribution header</b>	Pipe or flume delivering water from inlet connection to lateral headers, troughs, flumes or distribution basins.
18	<b>distribution system</b>	Those parts of a tower beginning with the inlet connection which distribute the hot circulating water within the tower to the point where it contacts the air.
19	<b>down spout</b>	A short vertical pipe or nozzle used in an open distribution system to discharge water from a flume or lateral on to a splash plate.
20	<b>drift eliminator</b>	A system of baffles located in the tower designed to reduce the quantity of entrained water in the outlet air.
21	<b>drift loss</b>	Water lost from the tower as liquid droplets entrained in the outlet air.
22	<b>effective volume</b>	The volume within which space the circulating water is in intimate contact with the air flowing through the tower.

No.	Term	Definition
23	<b>fan</b>	A rotary machine which propels air continuously. This is used for moving air in a mechanical draught tower and is usually of the axial-flow propeller type. The fan may be of induced draught or forced draught application.
24	<b>fan casing</b>	Those stationary parts of the fan which guide air to and from the impeller. In the case of an induced draught fan, the casing may form the whole or part of the fan stack.
25	<b>fan deck</b>	Surface enclosing the top of an induced draught tower, exclusive of any distribution system which may also form a part of the enclosure.
26	<b>fan drive assembly</b>	Components for providing power to the fan, normally comprising driver, drive shaft and transmission unit, and primary supporting members.
27	<b>fan duty (static)</b>	The inlet volume dealt with by a fan at a stated fan static pressure.
28	<b>fan duty (total)</b>	The inlet volume dealt with by a fan at a stated fan total pressure.
29	<b>fan power</b>	The power input to the fan assembly, excluding power losses in the driver.
30	<b>fan stack</b>	Cylindrical or modified cylindrical structure enclosing the fan in induced draught towers.
31	<b>fan-stack height</b>	Distance from top of fan deck to top of fan stack.
32	<b>fan static pressure</b>	The difference between the fan total pressure and the fan velocity pressure.
33	<b>fan total pressure</b>	The algebraic difference between the mean total pressure at the fan outlet and the mean total pressure at the fan inlet.
34	<b>fan velocity pressure</b>	The velocity pressure corresponding to the average velocity at the fan outlet, based on the total outlet area without any deductions for motors, fairings, or other bodies.
35	<b>film packing</b>	An arrangement of surfaces over which the water flows in a continuous film throughout the depth of the packing.
36	<b>heat load</b>	Rate of heat removal from the circulating water within the tower.
37	<b>hot water temperature</b>	Temperature of circulating water entering the distribution system.
38	<b>inlet air</b>	Air flowing into the tower; it may be a mixture of ambient air and outlet air.
39	<b>inlet air wet bulb temperature</b>	Average wet bulb temperature of the inlet air; including any recirculation effect. This is an essential concept for purposes of design, but is difficult to measure.
40	<b>louvres</b>	Members installed in a tower wall, to provide openings through which air enters the tower; usually installed at an angle to the direction of air flow to the tower.
41	<b>make-up</b>	Water added to the circulating water system to replace water loss from the system by evaporation, drift, purge and leakage.
42	<b>motor rated power</b>	Nameplate power rating of the motor driving the fan.
43	<b>nominal inlet air wet bulb temperature</b>	The arithmetical average of the measurements taken within 1.5 m of the air inlets and between 1.5 m and 2.0 m above the basin kerb elevation on both sides of the cooling tower.
44	<b>nominal tower dimensions</b>	Dimensions used to indicate the effective size of cells, or cooling tower. In the horizontal plane, they refer to the approximate width and length of packed areas, and in the vertical plane to the height above basin kerb level. NOTE The datum point for the height of all cooling towers is from basin kerb level.
45	<b>outlet air</b>	The mixture of air and its associated water vapour leaving the tower. (See Air flow.)

No.	Term	Definition
46	<b>outlet air wet bulb temperature</b>	Average wet bulb temperature of the air discharged from the tower.
47	<b>packing</b> FILLING	Material placed within the tower to increase heat and mass transfer between the circulating water and the air flowing through the tower.
48	<b>plenum</b>	The enclosed space between the eliminators and the fan stack in induced draught towers, or the enclosed space between the fan and the packing in forced draught towers.
49	<b>purge</b> BLOW DOWN	Water discharged from the system to control concentration of salts or other impurities in the circulating water.
50	<b>recooled water temperature</b>	Average temperature of the circulating water entering the basin.
51	<b>recirculation</b> RECYCLE	That portion of the outlet air which re-enters the tower.
52	<b>shell</b>	That part of a natural draught tower which induces air flow.
53	<b>splash packing</b>	An arrangement of horizontal laths or splash bars which promotes droplet formation in water falling through the packing.
54	<b>splash plate</b>	Used in an open distribution system to receive water from a down spout and to spread water over the wetted area of the tower.
55	<b>spray nozzle</b>	Used in a pressure distribution system to break up the flow of the circulating water into droplets, and effect uniform spreading of the water over the wetted area of the tower.
56	<b>sump</b> BASIN SUMP POND SUMP	A lowered portion of the cold water basin floor for draining down purposes.
57	<b>tower pumping head</b>	The head of water required at the inlet to the tower, measured above the basin kerb to deliver the circulating water through the distribution system.
58	<b>water loading</b>	Circulating water flow expressed in quantity per unit of packed plan area of the tower.
59	<b>wet bulb temperature</b>	The temperature indicated by an adequately ventilated and wetted thermometer in the shade and (where applicable) protected from strong ground radiation.

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