



DWI COMPLIANCE RISK INDEX (CRI)

Drinking Water Inspectorate

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DWI Compliance Risk Index (CRI): Definition

A new drinking water quality measure is required to replace the current Mean Zonal Compliance Index for a number of reasons, including those provisions in the proposed Water Supply (Water Quality) Regulations amendments 2016 (the Regulations) that will allow companies to move away from the current monitoring programme (based on sample numbers) to a risk based monitoring methodology to assess compliance.

The Compliance Risk Index (CRI) is a measure designed to illustrate the risk arising from treated water compliance failures, and it aligns with the current risk based approach to regulation of water supplies used by the Drinking Water Inspectorate (DWI). All compliance failures are assessed by DWI using the provisions of the Water Industry Act 1991. In doing so, DWI has regard to its published Enforcement Policy, and it also follows the principles of “better regulation” to scrutinise company performance on the basis of their risk of failing to meet the requirements of the Regulations.

This is a new measure developed in consultation with water companies, alongside the Event Risk Index (ERI – definition [link](#) here).

The following outlines the broad principles of the CRI measure.

- the significance of the parameter failing the standards in the Regulations (the Parameter score)
- the cause of the failure; the manner of the investigation of the failure by the company; and any mitigation put in place by the company (the Assessment score)
- the location of the failure within the supply system taking into account the proportion of the company’s consumers affected (the Impact score).

The formula for the calculation of the index is as follows:

$$\text{CRI} = \frac{\text{For compliance failures in water supply zones} \quad \Sigma \text{ SCP}}{\text{Total company population served}} + \frac{\text{For compliance failures at water treatment works or designated supply points} \quad \Sigma \text{ SCV}}{\text{Total volume of water supplied daily by the company (m}^3\text{/day)}} + \frac{\text{For compliance failures at service reservoirs} \quad \Sigma \text{ SCR}}{\text{Total Service Reservoir capacity of the company (m}^3\text{)}}$$

Where: S = Parameter score (see (i) below)

C = Assessment score (see (ii) below)

Impact score: (see (iii) below)

P = Population affected - for compliance failures in water supply zones

V = Volume affected (daily output (m³/day)) - for compliance failures at treatment works or designated supply point

R = SR capacity affected (capacity m³) for compliance failures at service reservoirs

i. Parameter score

Compliance failures for different parameters do not pose equal risk to consumers. The standards in the Regulations are based on different criteria: whilst some are set on a human health basis, others are based on aesthetic concerns, as indicators or for other reasons. This means that the risk posed from non-compliance with a parameter standard varies depending on the reason for the standard.

The CRI Parameter score reflects this difference and scores determined for each as follows:

Basis for standard	Score
Health Risk	5
Health Risk Indicator	4
Aesthetic	3
Regulatory Impact	2
Non Health Risk Indicator	1

Individual parameter scores are listed in Annex A.

ii. Assessment score

All compliance failures are assessed to ensure that the wellbeing and interests of consumers were protected by best practice in management of compliance failures. Obviously, a well-managed compliance failure with appropriate and speedy mitigation action poses a lower risk to consumers.

The DWI also considers the root cause of the failure and whether the company's actions led to or increased the likelihood of the failure, and whether further remedial action is necessary.

Therefore the DWI Inspector's assessment has been assigned a score for CRI shown below:

DWI Inspector assessment	Score
Enforce	5
Covered by legal instrument	4
Enforcement considered	4
Recommendations made	3
Suggestions made	2
Satisfactory investigation did not identify	1
Trivial	1
Unlikely to recur	1
Incorrect data	0
Outside operational limits	0

iii. Impact score

This element accounts for the likely impact of the compliance failure – the data used varies depending upon where in the supply chain the failure occurs:

- For company assets this impact element relates to the size of the asset (output of water treatment works and capacity of service reservoirs).
- For failures occurring in water supply zones (WSZ) the impact will tend to relate to the size of the whole zone. The impact will therefore default to the population of the whole WSZ.

Reporting timescales

The measure will be provisionally reported by the end of April each year, covering the previous calendar year (i.e. CRI for 2018 will be reported at the end of April 2019). This will include CRI scores for all compliance failures that occurred in the relevant calendar year.

There may be a small number of compliance failures where investigations are still ongoing at the end of April. For these an estimation of the CRI will be included based on the evidence to date.

An updated CRI will be reported in the Chief Inspector's Report in July by which time all compliance failure assessments for that year will have been completed.

Special rules

A limited number of risks may manifest themselves to a smaller population than the whole WSZ. Under this circumstance there is the option for DWI to consider whether the failure can be assigned to the Domestic Distribution System, or in the case of Lead, to the District Metered Area. The smaller population options will be fixed.

- **Impact scores related to Domestic Distribution Systems (DDS)**

The burden of proof rests with the company to provide compelling evidence that the DDS is the root cause of the failure. If the Inspectorate agree that the failure was caused by and isolated to the domestic system the Impact (Population) will automatically reduce to:

- **2.4** – Occurred at a single property (compelling evidence required)
- **50** – Occurred at a public building

- **Impact scores related to District Metered Areas (DMAs)** - applies to lead failures only.

The burden of proof rests with the company to demonstrate the effectiveness of the company plumbosolvency strategy within the DMA. Companies will be expected to carry out a full and thorough investigation to include:

1. A review of plumbosolvency measures in place
2. Whether there are other properties in the DMA with lead supply and communication pipes.
3. If there are other sources that might contribute to the lead failure apart from lead pipe.

If the company's investigation can demonstrate that the plumbosolvency strategy is effective within the DMA and that the lead failure was an isolated, property specific failure then the single property multiplier above will be used.

If the investigation cannot establish this, the fixed population of 1,000 (a standardised DMA) will be used as the default multiplier.

If the WSZ is < 1,000 the whole zone population will be used.

Relationship with ERI

In some circumstances compliance failures are reported as an event, and therefore may contribute to both CRI and ERI. Most of these will attract an ERI score of 0 on the basis that they are assessed as compliance breaches. There may be circumstances, however, where it is appropriate to score such occurrences under both the CRI and ERI indices, depending on the outcome of the company investigations and DWI assessments.

Annex A: Parameter Scores

PARAMETER NAME	LOCATION	SCORE	CRITERIA
1,2 Dichloroethane	Supply point	5	Health risk
Aldrin	Supply point/Zone	5	Health risk
Antimony	Zone	5	Health risk
Arsenic	Zone	5	Health risk
Benzene	Supply point	5	Health risk
Benzo (a) Pyrene	Zone	5	Health risk
Bromate	WTW/Supply point/Zone	5	Health risk
Cadmium	Zone	5	Health risk
Chromium	Zone	5	Health risk
Coliform Bacteria	WTW	5	Health risk
Cyanide	Supply point/zone	5	Health risk
Dieldrin	Supply point/Zone	5	Health risk
E coli	WTW/Service reservoir/Zone	5	Health risk
Enterococci	Zone	5	Health risk
Fluoride	Supply point/Zone	5	Health risk
Heptachlor	Supply point/Zone	5	Health risk
Heptachlor epoxide	Supply point/Zone	5	Health risk
Lead	Zone	5	Health risk
Mercury	Supply point/Zone	5	Health risk
Nickel	Zone	5	Health risk
Nitrate	Zone	5	Health risk
Nitrate/Nitrite Formula	Zone	5	Health risk
Nitrite	WTW/Zone	5	Health risk
Radioactivity - indicative dose	Supply point/Zone	5	Health risk
Selenium	Supply point	5	Health risk
Tetrachloroethene/ Trichloroethene - sum	Zone	5	Health risk
Tetrachloromethane	Zone	5	Health risk
Total Trihalomethanes	Zone	5	Health risk
Turbidity (Indicator)	WTW	5	Health risk
Aluminium	Zone	4	Health risk indicator
Boron	Supply point/Zone	4	Health risk indicator
Clostridium Perfringens (Indicator)	WTW/Supply point/Zone	4	Health risk indicator
Coliform Bacteria	Service reservoir	4	Health risk indicator
PAH	Zone	4	Health risk indicator
Turbidity	Zone	4	Health risk indicator
Colour	Zone	3	Aesthetic
Copper	Zone	3	Aesthetic
Iron	Zone	3	Aesthetic
Manganese	Zone	3	Aesthetic
Organoleptic Odour	Zone	3	Aesthetic
Organoleptic Taste	Zone	3	Aesthetic
Sodium	Zone	3	Aesthetic
Chloride	Supply point	2	Regulatory Impact
Coliform Bacteria (Indicator)	Zone	2	Regulatory Impact
Pesticides Individual	Supply point/Zone	2	Regulatory Impact
Pesticides - Total Substances	Supply point/Zone	2	Regulatory Impact
Pesticides - Individual - Metaldehyde	Supply point/Zone	2	Regulatory Impact
Ammonium (Indicator)	Zone	1	Non Health Risk Indicator
Conductivity	Supply Point	1	Non Health Risk Indicator
Hydrogen ion (pH)	Zone	1	Non Health Risk Indicator
Sulphate	Supply point/Zone	1	Non Health Risk Indicator
Cryptosporidium	Reservoir/WTW	0	Not a PCV failure
Fluoride (Fluoridated)	Supply point/Zone	0	Not a PCV failure
Gross Alpha Activity	Supply point/Zone	0	Screening value
Gross Beta Activity	Supply Point	0	Screening value