

## Civics

### [IBR rules](#)

### [Standards and agencies](#)

### [References](#)

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## IBR Rules

### **What is IBR?**

IBR stands for The Indian Boiler Regulations Act 1920 (with subsequent amendments). It is an Act of Law, and is therefore actual law in the country. It governs the manufacture, installation, operation and maintenance of Steam Boilers.

In the early 1900's when steam boilers first became widely used for industrial purposes, the simple control systems and high steam pressures caused a number of accidents. To prevent this, the British Government set up a British Boiler Regulation which specified that a Government Inspector would be responsible and would have to certify all steam boiler as suitable from a safety and engineering point of view. This was copied as the IBR in 1920. Thus, the IBR is not a "type" approval, in which once a certain type of design is approved, each unit does not need approval. Instead, it is a specific approval for each and every unit – every boiler, every valve, every trap, every pipe and so on.

With the development of better materials, safer control systems, advanced manufacturing techniques etc., it became pointless to have a government inspection for each and every unit, and every other country in the world has moved on to either self compliance to specified standards, or at most a type approval system. However, the IBR still specifies a unit approval, and every item used in an IBR steam system has to be manufactured, installed, tested, operated and maintained under the watchful eye of our dear local inspector.

### **How does it apply to our customers?**

Every customer who runs an IBR boiler has to have an annual IBR inspection by an IBR inspector. The local IBR office is a state government department, and maintains satellite offices close to each industrial zone, and they have to be invited to inspect the boiler and system.

### **What is an IBR boiler?**

A steam boiler is defined in the IBR act as a vessel containing greater than 22.5 litres of water which is used to generate steam. Generally, any boiler above 1000 Kg/hr capacity is an IBR boiler. Non IBR boilers are coil type water tube boilers, available in a capacity of 200 – 850 Kg/hr. Note that no pressure is specified in this regulation. What this means is that it is possible to have a small coil type boiler generating steam at 100 bar, and it is classified as a Non IBR boiler, as long as coil volume is below 22.5 litres.

### **What is an IBR system?**

The Act defines anything connected to an IBR Boiler as an IBR system i.e. All boiler mountings, steam distribution pipes, valves, traps, strainers etc. are all under IBR. The only concession provided here is that once the pressure of steam is dropped below 3.5 Kg/cm<sup>2</sup>g (50 psig), the system becomes Non IBR. This is why most process plants use 3.5 Kg/cm<sup>2</sup>g as process steam.

Note that a steam pipe connected to a single (or bank of multiple) Non IBR boilers is not an IBR line, as it is not connected to an IBR boiler, no matter what pressure it is operating at.

[Back to top](#)

**Where does IBR scope end?**

As stated earlier, a system is non IBR if one of the following is true:

The boiler or boilers are Non IBR coil type boilers

The steam pressure is dropped below 3.5 Kg/cm<sup>2</sup>g

At the last valve before the process equipment (the process equipment is again Non IBR, no matter what pressure it operates at)

Condensate is not steam – it is water – and is therefore exempt from IBR

That's why steam traps on the main lines have to be IBR, but traps installed on the process equipment are Non IBR.

**What does IBR mean for a manufacturer of steam equipment?**

An IBR licence is required to manufacture steam equipment – this is a factory approval, even before the unit can make a valve or pipe etc., and is given to those shops where adequate infrastructure exists for pressurised joint welding, testing etc.

A drawing of the product (with the client's name) has to be made and submitted for provisional IBR approval, and the corresponding fees paid

Once the approval is received, raw materials have to be purchased from IBR approved vendors, and each and every part has to have an IBR approval certificate

The inspector has to be called to inspect and approve the material before proceeding

The manufacturing can now be started, but must use welding methods and fabrication procedures as specified by IBR

The inspector has to be called back for inspection and approval of Tack welding

The manufacturing is now completed, full welding etc. done

The inspector has to be called back to inspect and approve hydrostatic and other testing

Once approved, the as-built drawing along with all inspection reports and drawings has to be submitted back to the IBR office for final approval.

Note that all this has to be done whether you are making a boiler, or simply attaching a one foot piece of pipe to a flange.

All this means a lot of extra cost, a lot of extra time, and basically a custom built product for each and every application. It also involves planning, adequate delivery period, liaison with inspectors etc.

[Back to top](#)

## Standards and agencies



Pic. The standards library

- **ANSI B31.1&3 Piping Standards (American)**
- **ASTM A 106 Specifications for Carbon Steel Pipes**
- **IS 1239 Specifications for ERW Pipes**
- **ANSI B 16.5 Steel Pipe Flanges & Flanged Fittings**
- **ANSI B 16.10 Face to face dimensions of ferrous valves**
- **ANSI B16.11 Threaded Pipe Fittings**
- **ASTM A 105 Specifications for Forged Valves**
- **ASTM A 216 Specifications for casting for Carbon Steel Valves**
- **ASTM A234 Forged Carbon Steel Pipe Fittings**
- **IS 2712 Gaskets for Fluid Flow Piping**
- **ASTM A193/4 HT Fasteners**
- **IS 1367 Fasteners for industrial service**

[Back to top](#)

# References

## English

Thermodynamics

<http://www.shodor.org/UNChem/advanced/thermo/#entropy>

Specific heat

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[http://www.engineeringtoolbox.com/si-unit-system-d\\_30.html](http://www.engineeringtoolbox.com/si-unit-system-d_30.html)

## Physics

Evaporation

<http://www.chemguide.co.uk/physical/phaseeqia/vapourpress.html>

Good photos on [http://wps.prenhall.com/wps/media/objects/439/449969/Media\\_Portfolio/ch03.html](http://wps.prenhall.com/wps/media/objects/439/449969/Media_Portfolio/ch03.html)

## Boilogy

Boiler controls

BOILER PLANT AND DISTRIBUTION SYSTEM OPTIMIZATION MANUAL,  
Second Edition by Harry R. Taplin

Safety valve

<http://www.facilitiesnet.com/ms/article.asp?id=1687>

Boiler pics from:

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<http://twaintimes.net/boat/sbpage4d.htm>

## Chemistry

Trapping, Msep

Basics of Steam System Design by W. M. (Bill) Huitt

Stack gas

<http://www.habmigern2003.info/suggestions/Overview/glossary/Stack-gas.html>

Combustion

[http://www.energy.wsu.edu/ftp-ep/pubs/engineering/boiler\\_comb.pdf](http://www.energy.wsu.edu/ftp-ep/pubs/engineering/boiler_comb.pdf)

Chimneys

[http://en.wikipedia.org/wiki/Industrial\\_chimneys](http://en.wikipedia.org/wiki/Industrial_chimneys)

## Glossary

<http://www.steamesteem.com/index.html>

[Back to top](#)