uitable type may

raduated to not orking pressure

(7 .5 gallons) afety valve shall l the diameter of n.).

ill be determined hour of heating can be generated 6 per cent. above lve shall be connections, without ng pipe or fitting ce-to-face dimen- im opening there of any description on the discharge

as or oil be pro- an automatic fuel a governor used failure, there can hamber of supply

with a lead

npan y an applica- ts. 30 per boiler.

CHAPTER XV

HEAT EXCHANGERS, CONVERTERS, EVAPORATORS AND SIMILAR VESSELS

623. Application.-**These Regulations shall apply** to **Heat Exchangers**, **Converters**, **Evaporators and similar vessels using steam** under **pressure as heating** medium.

624. Construction and Workmanship.**-These shall** conform to **the** require- ments of relevant **Regulations governing the particular type of construction**.

625. General requirements.-**Where applicable, the general requirements** of **Chapter I shall apply.**

626. Materials.-Materials **used** in the construction **of these vessels** shall comply with **the** appropriate

Regulations in **Chapter** II or **Chapter** XI. **Cast Iron shall**, however, be not used **beyond** service **temperatures and pressures of 218°C (425°F) and 11-25** kg/cm2 (160 lbs. per **sq. inch) respectively**.

627. Electrodes.-The electrodes **used shall be** of **appropriate** quality, suitable for **the material** of the part to **be welded approved by the Inspecting** Authority. The tensile strength **of the weld material** shall not be **less** than **the lower limit** specified for **the** part.

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628. Plain and Stay Tubes.-**The** tubes shall comply with **the** appropriate Regulations in **Chapter II.**

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629. Heat Treatment.-All fusion **welded** vessels shall **be heat treated** for stress **relief** in **accordance** with Regulation 267. In the case of alloy **steel vessels**, **the maximum** temperature **and the** soaking **period may be varied according to the requirements of the material with the approval of the** Inspecting **Authority**.

630. (*a*) Determination of working pressure of vessels **of** Riveted construction-**These shall** comply with **the** relevant provisions of Chapter **IV.**

(b) Determination **of** working pressure **of** vessels of **Welded** construc- tion.-

(i) Shells.-**The** working pressure **shall** be calculated in accordance with **Equation 72.**

(*ii*) Dished end plates.-**The** maximum working pressure of dished end **plates subject to** pressure on **the** concave **side shall be deter- mined by Equation** 74.

(iii) **Flat end** plates.-The maximum **working pressure of flat** end **plates shall be determined by appropriate Regulations in** Chapter III.

(c) Determination of working pressure of Cast Iron vessels.-

(i) Shells.-**The** working **pressure shall be calculated in accordance**

with **Equation 76**, where-

C=20**% of the tensile** strength of **the grade of iron used,**

and

x=0.5 cm. (0-2 in.).

(ii) Dished **end** plates.-**The working** pressure **for dished end plates subject to pressure on the concave side shall be determined by Equation** 74, **where-**

f=10% of **the tensile strength of the grade** of iron used **and the corrosion factor "C" shall be 0.5** cm. **(0-2 in.)**.

(iii) Flat end plates.-**The maximum** working pressure **of** `flat` end **plates** shall **be determined by** Equation **35**, where-

C=90% **of the tensile strength of the** grade **of iron used and C=10.5 cm** (0.2 **in.).**

(**d)** Bolts and Studs.-**Bolts and studs connecting parts of the vessel such as shell, end plates, tube plates, etc.; shall be** made **of steel**.

The maximum working pressure for **the bolts or studs shall be calculated by** Equation **45**.

631. Tubes.-**In the case of tubes** subjected **simultaneously to both internal and external** pressure**, the** working **pressure of the tubes and determined by Equation 87, shall not be less than the** difference **of** the **two** pressures. In no **case** however**, shall** the thickness **of tube be less** than **2.3 mm. (0-09").**

632. Dished **end** plates.-The **shape of dished** `end` **plates** shall be **in conformity with the** requirements **of Regulation 275.**

633. End plate attachments.-These shall **comply** with any one **of the** form **prescribed in Chapter X or Chapter XII**.

634. Tube plates.-The **minimum thickness of tube plates shall** comply **with the** requirements **of Regulation** 580.no

635. Stand pipes**,** nozzles, pads and seatings for mounting **and their** attachments. These **shall comply with the relevant Regulations**.