NB-3357  Thermal Treatment

All vessels and vessel parts shall be given the appropriate postweld heat treatment prescribed in NB-4620.

NB-3360  SPECIAL VESSEL REQUIREMENTS

NB-3361  Category A or B Joints Between Sections of Unequal Thickness

In general, a tapered transition section as shown in Figure NB-3361-1 which is a type of gross structural discontinuity (NB-3213.2) shall be provided at joints of Categories A and B between sections that differ in thickness by more than one fourth the thickness of the thinner section. The transition section may be formed by any process that will provide a uniform taper. An ellipsoidal or hemispherical head which has a greater thickness than a cylinder of the same inside diameter may be machined to the outside diameter of the cylinder provided the remaining thickness is at least as great as that required for a shell of the same diameter. A uniform taper is not required for flanged hubs. The adequacy of the transition shall be evaluated by stress analysis. Stress intensity limitations are given in NB-3220. The requirements of this paragraph do not apply to flange hubs.

NB-3362  Bolted Flange Connections

It is recommended that the dimensional requirements of bolted flange connections to external piping conform to ASME B16.5, Steel Pipe Flanges and Flanged Fittings.

NB-3363  Access Openings

Access openings, where provided, shall consist of handhole or manhole openings having removable covers. These may be located on either the inside or outside of the shell or head openings and may be attached by studs or bolts in combination with gaskets or welded membrane seals or strength welds. Plugs using pipe threads are not permitted.

NB-3364  Attachments

Attachments used to transmit support loads shall meet the requirements of NB-3135.

NB-3365  Supports

All vessels shall be so supported and the supporting members shall be arranged and attached to the vessel wall in such a way as to provide for the maximum imposed loadings. The stresses produced in the vessel by such loadings and by steady state and transient thermal conditions shall be subjected to the stress limits of this Subsection. Additional requirements are given in NCA-3240 and Subsection NF.

NB-3400  PUMP DESIGN

NB-3410  GENERAL REQUIREMENTS FOR CENTRIFUGAL PUMPS

NB-3411  Scope

NB-3411.1  Applicability. The rules of NB-3400 apply to (a) through (j) below.

(a) pump casings
(b) pump inlets and outlets
(c) pump covers
(d) clamping rings
(e) seal housing and seal glands
(f) related bolting
(g) pump internal heat exchanger piping
(h) pump auxiliary nozzle connections up to the face of the first flange or circumferential joint in welded connections, excluding the connecting weld
(i) piping identified with the pump and external to and forming part of the pressure-retaining boundary and supplied with the pump
(j) mounting feet or pedestal supports when integrally attached to the pump pressure-retaining boundary and supplied with the pump

NB-3411.2  Exemptions. The rules of NB-3400 do not apply to (a) through (c) below.

(a) pump shafts and impellers; shafts may be designed in accordance with Appendix S
(b) nonstructural internals
(c) seal packages
Figure NC-3358.1(a)-1
Heads Attached to Shells

GENERAL NOTES [sketches (a) and (b)]:
(a) Length of required taper \( \ell \) may include the width of the weld.
(b) In all cases, the projected length of taper \( \ell \) shall be not less than 3\(y\).
(c) The shell plate center line may be on either side of the head plate center line.

After (a) & (b) insert "[Notes (1), (2), and (3)]"

GENERAL NOTES [sketches (c) and (d)]:
(a) In all cases, \( \ell \) shall be not less than 3 times \( y \) when \( t_h \) exceeds 1.25\(t_h\); minimum length of skirt is 3\(t_h\), but need not exceed 1\(\frac{1}{2}\) in. (38 mm) except when necessary to provide required length of taper.
(b) When \( t_h \) is equal to or less than 1.25\(t_h\), length of skirt shall be sufficient for any required taper.
(c) Length of required taper \( \ell \) may include the width of the weld.
(d) The shell plate center line may be on either side of the head plate center line.

After (c) & (d) insert "[Notes (1), (3), (4) and (5)]"
Add the following after NC-3358.1(a)-1

NOTES:
(1) Length of required taper ℓ may include the width of the weld.
(2) In all cases, the projected length of taper ℓ shall be not less than 3y.
(3) The shell plate center line may be on either side of the head plate center line.
(4) In all cases, ℓ shall be not less than 3 times y when \( t_h \) exceeds 1.25\( t_s \); minimum length of skirt is 3\( t_h \) but need not exceed 1 ½ in. (38 mm) except when necessary to provide required length of taper.
(5) When \( t_h \) is equal to or less than 1.25\( t_s \), length of skirt shall be sufficient for any required taper