Errata Sheet
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Page 5  2nd paragraph from bottom, 3rd line from bottom. “or control or material or energy” should be “or control of material or energy.”

Page 29  Table 1-14. Item 1 on top left side of table. “Read the Category…” should be “Read the Severity Category…”

Page 30  Last line in footnote at bottom. “…Lagging Indicator” should be “Lagging Indicators”

Page 37  Table 1-18. Items in table should be numbered consecutively from 1 to 20.

Page 45  Table 1-21. Use bold text for far-left column.


Page 125  Equation 4-7. The Greek $\mu$ on the left hand side should be a $\bar{u}$.

Page 131  Right hand side of Equation 4-28. $m$ should be $\dot{m}$.

Page 138  Towards bottom after “and it follows that”. Right hand side of equation $\bar{u}^2$ should be $\frac{\bar{u}^2}{g_c}$.

Page 141  Sentence below Equation (4-45). “$T_o$ is the temperature” should be “$T_o$ is the absolute temperature.”

Page 141  Equation (4-48). Exponent on right hand term should be divided by $\gamma$ not $y$.

Page 143  Variable list below Equation (4-50). “$T_o$ is the temperature” should be “$T_o$ is the absolute temperature.”

Page 149  2nd paragraph below Equation (4-67). “and temperature” should be “and absolute temperature”.

Page 153  1/3 of the way down. $\delta W_{x=0}$ should be $\delta W_x = 0$.

Page 155  Table 4-5. Pressure Drop Ratio should not be italicized.

Page 161  Table at end of Example 4-5. Under item b, for “Simplified” case, 113.4 should be 49.4.

Page 168  Variable list below Equation (4-106). “$T_1$ is the temperature” should be “$T_1$ is the absolute temperature”.

Page 170  Table 4-6. Under “Vessels” Last sentence under “Guideline” should be “Use the Process Pipes criteria above.”

Page 176  Equation with problem 4-17. $-u$ should be $u$ without minus sign.

Page 227  Equations (6.2) and (6.3) should be (6-2) and (6-3).

Page 254  Table 6-6. 4th column from left. “Senecalz” should be “Senecal”. Also “beaulieu” should be “Bealieu” in two places.

Page 272  Variable list under Equation (6-36). “$T_1$ is the ambient temperature” should be “$T_1$ is the absolute temperature”.

Page 275  Example 6-13. Problem statement. “15 m” should be “150 m”

Page 283  2nd line from bottom. “Acceptable” should be “Accepted”.

Page 311  2nd line of text: Equation 7-26 should be Equation 7-27.

3rd line of text below Method 2: Equation 7-28 should be Equation 7-29.

5th line of text below Method 2: “Substitution into Equation 7-28” should be
“Substitution into Equation 7-29”

Further on down page: “determined using Equation 7-20” should be “determined using Equation 7-21”

Page 314
Last line in Example 7-5: “Table 7-5” should be “Table 7-6”

Page 363
The lettering “c.” should be on first line at top of page.
Present “c.” should be “d.”
Present “d.” should be “e.”

Page 367
Change x-axis title to: \( B_\text{x}/(1+B_\text{x})=(T-T_\text{s})/T \)

Page 377
Problem 8-7, last line of text. \( x_m=5.0 \) should be \( x_m=0 \)

Page 405
Arrange Table 9-7 from highest to lowest heat intensity.
Left hand column should be, from top to bottom: 5300, 3000 – 4000, 2000, 350.
Rearrange right hand side accordingly.

Page 413
3rd line below heading for section 10-1. “In the table, the accumulated pressure …” should be “In the table, the maximum accumulated pressure…”

Page 421
Replace first sentence in last paragraph at bottom. “Manufacturers do not provide relief devices to the nearest 0.01 in.” should be “Relief devices are provided by the manufacturer in standard, fixed sizes.”

Page 423
In the nomenclature definitions under Equation (10-12). Change “\( P \) is the upstream relieving pressure, equal to the set pressure plus the allowable overpressure” to “\( P \) is the maximum relieving pressure, equal to the set pressure plus the allowable overpressure (see Example 10-1)”

Page 424
First line below “Steam Flow Relief Sizing”. “steam a well known” should be “steam are well known”

Page 425
Example 10-4: Change the first paragraph of the solution to: “From Table 10-1, the maximum set pressure is equal to the vessel MAWP at 3.0 barg. The maximum relieving pressure is 1.10 x 3.0 barg = 3.3 barg = 4.3 bara (see Example 10-1).

Page 426
Second paragraph from top of page. “The maximum accumulated pressure ..” should be “The maximum relieving pressure …”
6th text line from bottom of page. Figure 10-6 should be Figure 10-5.

Page 431
3rd text line from top: Equation 4-103: should be Equation 10-17:

Page 451
Problem 10-7 should be the following:

10-7. Determine the deflagration vent size for the following structures.

<table>
<thead>
<tr>
<th>Vapors</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal area of structure:</td>
<td>1000 ft(^2)</td>
<td>1000 ft(^2)</td>
<td>300 m(^2)</td>
<td>300 m(^2)</td>
</tr>
<tr>
<td>Turbulent augmentation factor, ( \lambda ):</td>
<td>1.0</td>
<td>1.5</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Max. internal pressure, ( P_{\text{red}} ):</td>
<td>0.05 bar</td>
<td>0.10 bar</td>
<td>0.05 bar</td>
<td>0.10 bar</td>
</tr>
<tr>
<td>Gas:</td>
<td>Methane</td>
<td>Hydrogen</td>
<td>Methane</td>
<td>Hydrogen</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dusts</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of structure:</td>
<td>1000 ft(^3)</td>
<td>1000 ft(^3)</td>
<td>30 m(^3)</td>
<td>30 m(^3)</td>
</tr>
<tr>
<td>Deflagration index, ( K_{\text{St}} ), bar m/s:</td>
<td>200</td>
<td>300</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>Opening pressure of vent, ( P_{\text{stat}} ):</td>
<td>3 psig</td>
<td>6 psig</td>
<td>0.2 barg</td>
<td>0.4 barg</td>
</tr>
<tr>
<td>Max. pressure of unvented, ( P_{\text{max}} ):</td>
<td>150 psig</td>
<td>200 psig</td>
<td>10 barg</td>
<td>15 barg</td>
</tr>
</tbody>
</table>
Max internal pressure, $P_{\text{red}}$: 6 psig 8 psig 0.4 barg 0.6 barg

Page 476 4th line from top. Replace the sentence beginning with “The final column lists …” with “The final column lists the recommendations / actions required. Recommendations are any new barriers to be added. Actions address information needs for completing the HAZOP.”

Page 477 Table 11-10. At top of table. Both Project Name and Process should reference Example 11-2, not 11-4. At top of table. Section should refer to Figure 11-6, not “example 11-6.” Replace final column name “Action required” with “Recommendations / Actions”

Page 493 Example 12-2. Change “This system is activated at a pressure somewhat higher than the alarm system and consists of a pressure switch connected to a solenoid valve in the reactor feed line” to “This system is activated at a pressure somewhat higher than the alarm system and consists of a pressure controller connected to a solenoid valve in the reactor feed line”

Page 494 Table with solution to Example 12-2. Change “1. Pressure switch 1” to “Pressure switch”. Change “3. Pressure switch 2” to “3. Pressure controller”.

Page 509 Example 12-5. Bottom paragraph in example. Change “The alarm indicator can fail by a failure of either pressure switch 1 or the alarm indicator light. These must be connected by an OR gate. The emergency shutdown system can fail by a failure of either the pressure switch 2 or the solenoid valve.” to “The alarm indicator can fail by a failure of either the pressure switch or the alarm indicator light. These must be connected by an OR gate. The emergency shutdown system can fail by a failure of either the pressure controller or the solenoid valve.”

Page 510 Figure 12-14. Change at bottom on left hand side “Pressure Switch 1 Failure” to “Pressure Switch Failure”. Change at bottom on 2nd circle from right hand side “Pressure Switch 2 Failure” to “Pressure Controller Failure”.

Page 523 Item 4 in list at top of the page. Replace with:
4. Safety Instrumented System (SIS): The SIS is separate from the BPCS and consists of multiple Safety Instrumented Functions (SIF), designed to achieve a specific SIL. The SIS consists of the SIFs and all associated field sensors, logic solver, final control elements, etc. The purpose of the SIF is to isolate the threat and put the unit in a safe state - this may or may not include shutting down the process.

Page 524 Item 7 on list. “as low as reasonably possible” should be “as low as reasonably practicable”.

Page 536 Last line on bulleted list. Change “Are often very dirty” to “Are often dirty since they soil everything they touch meaning they have a widespread effect”
<table>
<thead>
<tr>
<th>First Letter</th>
<th>Succeeding Letters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measured or Initiating Variable</strong></td>
<td><strong>Modifier</strong></td>
</tr>
<tr>
<td>A</td>
<td>Analysis</td>
</tr>
<tr>
<td>C</td>
<td>Control</td>
</tr>
<tr>
<td>D</td>
<td>Density</td>
</tr>
<tr>
<td>F</td>
<td>Flow</td>
</tr>
<tr>
<td>H</td>
<td>Hand</td>
</tr>
<tr>
<td>I</td>
<td>Current</td>
</tr>
<tr>
<td>L</td>
<td>Level</td>
</tr>
<tr>
<td>P</td>
<td>Pressure, vacuum</td>
</tr>
<tr>
<td>Q</td>
<td>Quantity</td>
</tr>
<tr>
<td>R</td>
<td>Radiation</td>
</tr>
<tr>
<td>S</td>
<td>Speed</td>
</tr>
<tr>
<td>T</td>
<td>Temperature</td>
</tr>
<tr>
<td>V</td>
<td>Vibration</td>
</tr>
<tr>
<td>Z</td>
<td>Position</td>
</tr>
</tbody>
</table>

Also, please place a light horizontal line between every third element in table to improve readability.

Add the following to the list below the table:

- PV: Pressure valve
- PSV: Pressure safety valve
- PAL: Pressure alarm low
- PAH: Pressure alarm high
- HV: Hand valve or manual valve

Page 621 RAGAGEP near bottom of right hand column should be:
“Recognized and Generally Accepted Good Engineering Practices”