

Contents	Page
1 Introduction.....	1
2 Scope	1
3 Definitions.....	1
4 General safety considerations.....	3
4.1 Catalyst composition hazards (SDS considerations).....	3
4.2 Pyrophoric and self-heating hazards.....	3
4.3 Nickel/iron carbonyl hazards and safeguards.....	3
4.4 Work permits, system isolation, and work planning.....	4
4.5 Personal protective equipment.....	4
4.6 Vessel entry and purging.....	4
4.7 Working at heights.....	5
4.8 Equipment-related precautions.....	5
4.9 Housekeeping.....	6
5 Catalyst types and descriptions.....	6
5.1 Hydrogenation	6
5.2 Purification and ultrapurification	6
5.3 Prereformer	7
5.4 Tubular (primary) reforming.....	8
5.5 Secondary reforming	8
5.6 Autothermal reforming.....	8
5.7 High temperature shift.....	8
5.8 Medium/low temperature shift and isothermal shift.....	9
5.9 Methanation.....	9
5.10 Selective catalytic reduction	10
6 Storage and handling	10
6.1 Drums.....	11
6.2 Bulk containers.....	11
6.3 Socks.....	12
6.4 SCR catalyst.....	12
7 Catalyst loading or unloading	12
7.1 General considerations.....	12
7.2 Tubular reactors—reformer.....	13
7.3 Fixed vessel reactors.....	16
7.4 Selective catalytic reduction catalyst.....	18
7.5 Other tubular reactors.....	19
8 Stabilization and disposal.....	19
8.1 Stabilization.....	19
8.2 Labelling.....	20
8.3 Transportation and disposal.....	20
9 References.....	21
Figure	
Figure 1—Key components of a differential pressure rig.....	15