

DEP SPECIFICATION

GUIDELINES FOR CURING, DRYING AND FIRING OF UNSHAPED REFRACTORY LINING MATERIALS

DEP 64.24.32.33-Gen.

September 2012

DESIGN AND ENGINEERING PRACTICE



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1. INTRODUCTION

1.1 SCOPE

This new DEP specifies requirements and gives recommendations for curing, drying, and firing of engineered monolithic linings from unshaped refractory materials.

The requirements/recommendations in this DEP can be applied to new linings, repairs to existing linings, single and multi-layered linings, and linings dried and partially fired either on the footprint or in fabrication shops.

This DEP is applicable to various classifications and types of unshaped materials with the general chemical classification of alumina-silica, with the exception of man-made vitreous fibres.

This DEP does not cover specialized unshaped refractory materials used in cat cracking units. Reference is given to DEP 64.24.32.12-Gen. that forms the basis for all aspects of specification, supply, installation, dry and fire and quality control of refractory materials for cat cracking units and supersedes this DEP in areas of conflict.

This is a new DEP with content that is partially based on material previously contained in DEP 64.24.32.30-Gen., December 1997 (now withdrawn).

1.2 ASSOCIATED DEPS

The following DEPs are intended to be used in conjunction with each other for unshaped refractory.

DEP 44.24.32.30-Gen.	Unshaped refractory materials for monolithic refractory linings
DEP 44.24.32.31-Gen.	Classification of unshaped refractory lining materials
DEP 44.24.32.32-Gen.	Specification for sampling and testing of unshaped refractory lining materials
DEP 44.24.32.33-Gen.	Specification for anchoring systems of unshaped refractory lining materials
DEP 64.24.32.33-Gen.	Guidelines for curing, drying and firing of unshaped refractory lining materials
DEP 64.24.32.34-Gen.	Refractory Contractor selection and applicator qualification for installation of unshaped refractory lining materials
DEP 64.24.32.35-Gen.	Construction design details of unshaped refractory lining materials

1.3 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorised by Shell GSI, the distribution of this DEP is confined to Shell companies and, where necessary, to Contractors and Manufacturers/Suppliers nominated by them. Any authorised access to DEPs does not for that reason constitute an authorisation to any documents, data or information to which the DEPs may refer.

This DEP is intended for use in facilities related to oil and gas production, gas handling, oil refining, chemical processing, gasification, distribution and supply/marketing. This DEP may also be applied in other similar facilities.

When DEPs are applied, a Management of Change (MOC) process shall be implemented; this is of particular importance when existing facilities are to be modified.

If national and/or local regulations exist in which some of the requirements could be more stringent than in this DEP, the Contractor shall determine by careful scrutiny which of the requirements are the more stringent and which combination of requirements will be acceptable with regards to the safety, environmental, economic and legal aspects. In all

cases, the Contractor shall inform the Principal of any deviation from the requirements of this DEP which is considered to be necessary in order to comply with national and/or local regulations. The Principal may then negotiate with the Authorities concerned, the objective being to obtain agreement to follow this DEP as closely as possible.

1.4 DEFINITIONS

1.4.1 General definitions

The **Contractor** is the party that carries out all or part of the design, engineering, procurement, construction, commissioning or management of a project or operation of a facility. The Principal may undertake all or part of the duties of the Contractor.

The **Manufacturer/Supplier** is the party that manufactures or supplies equipment and services to perform the duties specified by the Contractor.

The **Principal** is the party that initiates the project and ultimately pays for it. The Principal may also include an agent or consultant, authorised to act for, and on behalf of, the Principal.

The word **shall** indicates a requirement.

The word **should** indicates a recommendation.

1.4.2 Specific definitions

Term	Definition
Auxiliary Dry-out	The first heating process using other than fixed burner and control systems. Auxiliary dry outs may or may not use in situ flue gas systems.
Alkaline Hydrolysis	Potentially destructive reactions between unfired hydraulic-setting unshaped castables, carbon dioxide, alkaline compounds and water.
Brand	An individual material or product name designated by the Manufacturer to identify materials matching physical properties of specific types.
Chemically Combined Water	Water contained in hydrates formed during curing of hydraulic bonded materials, also referred to as water of crystallization or water contained in phosphate chains of phosphate bonded materials, with different heat characteristics than free water.
Curing	The ambient before drying process of bond development in hydraulic bonded materials.
Dry-out	The heating from ambient temperature to a temperature where all moisture (mechanical from installing and chemical from curing) has been removed from unshaped hydraulic bonded materials. Dry-out also includes dehydration of chemically bonded products containing water from pre-reacted forms of organic or inorganic bonding chemicals.
Drying and Firing Procedure	The entire procedure to remove all moisture and high temperature stabilize unshaped materials for the intended operation. Entire procedure fully details material and construction requirements, all equipment requirements, initial heat ramp and hold schedules, introduction of process atmospheres and is inclusive of monitoring and safety requirements.
Engineered Monolithic Construction	A monolithic lining from unshaped materials with engineered anchors supports expansion and construction joints from success based installation standards and procedures.
Free Water	Excess water in hydraulic bonded castables that is not consumed by the bonding process maintaining the general heat characteristics of water.
Initial Firing	The first heating from a dried state up to full normal operating temperature.