PROGRESS MEASUREMENT FOR COMMISSIONING AND START-UP

ENGINEERING TECHNICAL STANDARDS & PROCEDURES

PT KILANG PERTAMINA INTERNASIONAL

DIREKTORAT PROYEK INFRASTRUKTUR

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1. INTRODUCTION

1.1 This document describes work procedure progress measurement for Commissioning and Start-Up.

2. SCOPE

2.1 This procedure describes the progress measurement for Commissioning and Start-Up.

3. CONFLICTS AND DEVIATIONS

3.1 Any conflicts between this standard and other applicable Engineering Technical Standards & Procedures (ETSP), or OWNER standards, codes, and forms shall be resolved in writing by OWNER.

3.2 All direct requests to deviate from this standard (ETSP) in writing to OWNER, who shall follow internal OWNER procedure and forward such requests to OWNER for approval.

4. ABBREVIATIONS

4.1 Abbreviations used for this document shall have the following definitions:

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ISA	International Studies Association
TEMA	Tubular Exchanger Manufacturer Association

5. DEFINITIONS

5.1 The following words shall have these special meanings when used herein:

PROJECT	[Project Name]
OWNER	Owner of the Plant is

1. PENGANTAR

1.1 Dokumen ini menjelaskan prosedur kerja untuk pengukuran *progress* untuk *Commissioning* dan *Start-Up*.

2. LINGKUP

2.1 Prosedur ini menjelaskan pengukuran progress untuk kegiatan *Commissioning* and *Start-Up* pada proyek di lingkungan PT Kilang Pertamina Internasional (PT KPI).

3. KONFLIK DAN DEVIASI

3.1 Apabila terdapat konflik antara standar ini dengan *Engineering Technical Standards & Procedures* (ETSP) yang berlaku lainnya, atau standar PEMILIK, *codes* dan formulir, maka harus diselesaikan secara tertulis oleh PEMILIK.

3.2 Semua permintaan penggunaan standar yang berbeda dari standar ini (ETSP), harus diajukan kepada PEMILIK secara tertulis dengan mengikuti prosedur internal PEMILIK untuk mendapatkan persetujuan.

4. SINGKATAN

4.1 Singkatan yang digunakan pada dokumen ini harus memiliki definisi sebagai berikut:

ANSI	*American National Standards Institute*
ASME	*American Society of Mechanical Engineers*
ISA	*International Studies Association*
TEMA	*Tubular Exchanger Manufacturer Association*

5. DEFINISI

5.1 Penggunaan kata-kata berikut harus memiliki arti khusus sebagai berikut:

PROYEK	[Nama Proyek]
PEMILIK	Pemilik Kilang

	defined as PT Kilang Pertamina Internasional.		didefinisikan sebagai PT Kilang Pertamina Internasional.
CONTRACTOR/ CONSULTANT	Defined as The Organization to which PT Kilang Pertamina Internasional assign the work.	KONTRAKTOR/ KONSULTAN	Didefinisikan sebagai Organisasi yang ditunjuk oleh PT Kilang Pertamina Internasional untuk melakukan suatu pekerjaan.
LICENSOR	Licensor Name	LICENSOR	Nama *Licensor*
EPC CONTRACT	EPC Contract awarded to CONTRACTOR by OWNER	EPC CONTRACT	Kontrak EPC yang dilimpahkan ke KONTRAKTOR
Shall	The word 'Shall' indicates a requirement.	*Shall*	Kata "Harus" menunjukkan persyaratan.
Should	The word 'should' indicates a recommendation	*Should*	Kata 'seharusnya' menyatakan rekomendasi

6. CODE, STANDARD, AND REFERENCES

a. Work Breakdown Structure
b. Progress Measurement for Construction Work
c. Project Handover Procedure
d. System Definition

6. KODE, STANDAR DAN REFERENSI

a. *Work Breakdown Structure*
b. *Progress Measurement for Construction Work*
c. *Project Handover Procedure*
d. *System Definition*

7. WEIGHT PERCENT FOR COMMISSIONING AND START-UP

Percentage of weighting is allocated to Commissioning and Start-up as described on the Contract. The percentage shall be distributed to each unit/ system/ discipline/ commissioning activity.

This procedure covers the calculation of progress measurement for Commissioning & Start-Up. Progress measurement for Pre-Commissioning activity is described in the document Progress Measurement for

7. PERSENTASE BOBOT UNTUK COMMISSIONING DAN START-UP

Bobot persentase yang dialokasikan untuk *Commissioning* dan *Start-up* sebagaimana ditentukan dalam Kontrak. *Breakdown* dari bobot tersebut didistribusikan ke bobot masing-masing unit/ sistem/ disiplin/ aktifitas *commissioning*.

Prosedur dibawah ini mengatur perhitungan progress pekerjaan *Commissioning* & *Start-Up* berdasarkan bobot pekerjaan. Pekerjaan *Pre-Commissioning* dijelaskan pada dokumen

Construction Works.

7.1 Punch Items

Since punch item closure is one of action to gain progress in each phase, punch categories are described hereafter.

a. Category “A” Punch Items:
Punch items where the completion is mandatory prior to mechanical completion (MC).
Example of Category “A” punch items:
i. Physical installation work of concrete, steel structure, equipment, piping, cables, panels, and junction box.
ii. Any activities that categorized as hot work
iii. Piping reinstatement
iv. Instrument loop testing & function test
v. Pre-commissioning activity or referred to document No RP-ETP-CSU-GP-0010 System Completion Execution

b. Category “B” Punch Items :
Punch items where the completion is mandatory to declare Ready For Start-up.
Example of Category “B” punch items:
i. Completion of the item is essential to start up the plant
ii. The work cannot be performed once the plant is started-up

c. Category “C” Punch Items :
Means the system completion punch items that completion is mandatory to receive confirmation of Operation Acceptance.

d. Deffect & Defficiency

Progress Measurement for Construction Works.

7.1 *Punch Items*

Dikarenakan penyelesaian *punch item* menjadi salah satu aktivitas untuk mendapatkan progress pada setiap fase, kategori *punch item* dikategorikan sebagai berikut

a. *Punch Item* Kategori “A”:
Merupakan *item punch* yang wajib diselesaikan pada saat konstruksi sebelum *Mechanical Completion* (MC)
Contoh *Punch Items* Kategori “A”:
i. Pekerjaan instalasi *concrete, steel structure, equipment, piping, cables, panels* dan *junction box*.
ii. Seluruh aktivitas yang membutuhkan *hot work*
iii. *Piping reinstatement*
iv. *Instrument loop testing & function test*
v. Aktivitas *Pre-commissioning* atau merefer ke dokumen ETSP Pemilik RP-ETP-CSU-GP-0010 *System Completion Execution.*

b. *Punch Items* Kategori “B”
Merupakan *item punch* yang wajib diselesaikan sebelum dinyatakan *Ready for Start-Up.*
Contoh *punch items* Kategori “B”;
i. *Item completion* yang wajib diselesaikan untuk *start-up plant*
ii. *Item* yang tidak dapat dikerjakan setelah *start-up the plant*

c. *Punch Items* Kategori “C”.
Merupakan *item punch* yang wajib diselesaikan sebelum dinyatakan *Operation Acceptance*.

e. *Deffect & Defficiency*

Punch items that can be completed after Operational Acceptance (OA) or found during the warranty period. This punch item must be completed before the declaration of Final Acceptance.

Merupakan *item punch list* yang dapat diselesaikan setelah *Operational Acceptance* (OA) atau ditemukan pada saat *warranty period*. *Item punch list* ini wajib diselesaikan sebelum dinyatakan *Final Acceptance*.

7.2 Commissioning And Start-Up Progress Measurement Method

The overall planning of the Project will be optimized if the construction, pre-commissioning, and commissioning activities are organized, not as whole plant activities, but by sections of the plant, called "Systems". The construction completion sequence will be fitted to the corresponding *pre-commissioning*, *commissioning*, start-up, and tie-in plan. With the result that plans for completion and commissioning of the system are aligned.

Progress measurement for commissioning on a system as follows:

a. 80%: When commissioning activity in a system has been completed by the Commissioning Record, that has been signed by OWNER.

b. 20%: When all commissioning activities have been completed and all punch lists category B have been completed and proven by the Consolidated Master Punchlist or Punchlist B Closing Report.

7.2 Metode Pengukuran *Progress Commissioning* Dan *Start-Up*

Untuk mengoptimalisasi perencanaan dari proyek, pekerjaan kontruksi, *pre-commissioning* dan *commissioning* dikelompokkan menjadi bagian-bagian dari *plant*, yang disebut "Sistem". Selesainya pekerjaan konstruksi pada Sistem akan merunut ke pekerjaan *pre-commissioning*, *commissioning*, start-up dan rencana *tie-in*. Sehingga rencana untuk penyelesaian dan *commissioning* sistem menjadi selaras.

Pengukuran progress untuk *commissioning* pada suatu Sistem sebagai berikut:

a. 80% : Ketika aktivitas *Commissioning* dalam suatu sistem telah selesai dibuktikan oleh *commissioning record* yang telah ditandatangani oleh PEMILIK.

b. 20% : Ketika seluruh aktivitas *commissioning* telah selesai dan seluruh *punch list* kategori B telah diselesaikan dan dibuktikan dengan *consolidated master Punchlist* atau *Punchlist* B *Closing Report*.

7.3 Calculation Formula of Commissioning And Start-Up

- **Commissioning**

7.3 Rumus Perhitungan *Commissioning And Start-Up*

[PX] Commisioning Progress in Unit X is:

[PX] Progress Commissioning pada Unit X adalah:

$$[\mathrm{PX}] = \left[\frac{AX\ x\ 80\% + BX\ x\ 20\%}{ZX}\right] x\ WTX$$

[AX]	:	Total system where commissioning has been completed in unit X	[AX]	:	Jumlah system dimana *Commissioning* telah selesai dalam unit X
[BX]	:	Total systems where punch list B has been completed in unit x	[BX]	:	Jumlah system dimana *Punchlist* B telah selesai dalam unit X
[ZX]	:	Total system in unit X	[ZX]	:	Jumlah Sistem dalam unit X
[WTX]	:	Commissioning weight in unit X	[WTX]	:	Bobot *Commissioning* dalam unit X
[PX]	:	Progress Commissioning phase in Unit X	[PX]	:	Progress fase *Commissioning* dalam unit X
X	:	System Unit Name	X	:	Nama Sistem Unit

[PC] Total Progress Commissioning Phase is:
[PC] Total Progress fase Commissioning adalah:

$$[\mathrm{PC}] = \sum^{i=n}[\mathrm{PX}]\ \mathrm{x\ Wi}$$

[Wi]	:	Weight of each unit	[Wi]	:	Bobot masing-masing unit

[PX] Commisioning Progress in Unit X is:
[PX] Progress Commissioning pada Unit X adalah:

$$[\mathrm{PX}] = \left[\frac{AX\ x\ 80\% + BX\ x\ 20\%}{ZX}\right] x\ WTX$$

[AX]	:	Total systems where commissioning has been completed in unit X	[AX]	:	Jumlah sistem dimana *Commissioning* telah selesai dalam unit X
[BX]	:	Total systems where punch list B has been completed in unit x	[BX]	:	Jumlah system dimana *Punchlist* B telah selesai dalam unit X
[ZX]	:	Total system/ subsystem in unit X	[ZX]	:	Jumlah Sistem/Subsistem dalam unit X
[WTX]	:	Commissioning weight in unit	[WTX]	:	Bobot *Commissioning* dalam

X

[PX] : Progress Commissioning phase in Unit X

X : System Unit Name

unit X

[PX] : Progress fase *Commissioning* dalam unit X

X : Nama Sistem Unit

[PC] Total Progress Commissioning Phase is:
[PC] Total Progress fase Commissioning adalah:

$$[\mathrm{PC}] = \sum^{i=n}[\mathrm{PX}] \text{ x Wi}$$

[Wi] : Weight of each unit

[Wi] : Bobot masing-masing unit

Commissioning should be tied to the number of systems/subsystems identified in the previous stage handover to.

Commissioning harus diikat dalam jumlah sistem/ subsistem yang diidentifikasi pada penyerahan tahap sebelumnya.