**Questionnaire for Technical Information**

To evaluate the benefits of eco-e tech (TORUS, ECOFEEDER, and remaining heat recuperation), we kindly ask you to fill-in the following questionnaire:

Steel plant: … Project: …

Country: … Tel.: …

Contact person: … e-mail: …

1. **General information:**

|  |  |  |
| --- | --- | --- |
| Net working hours per year | [h/y] |  |
| Daily prod. hours | [h/day] |  |
| Annual production: | [t/year] |  |

1. **Actual furnace set-up:** 🞎 **DC** 🗹 **AC**

|  |  |  |
| --- | --- | --- |
| Tapping Weight | [t] |  |
| Furnace capacity (diff = heel) | [t] |  |
| Transformer capacity | [MVA] |  |
| Average active power input | [MW] |  |
| Electrode diam. | [mm] |  |
| Charging Material |  |  |
| * Scrap | [%] |  |
| * DRI / HBI | [%] |  |
| * Hot Metal | [%] |  |
| ‘Mise au mille’ | [-] |  |
| Scrap Density (min / max) | [t/m3] |  |
| Scrap preheating installed | Y/N | 🞎 Yes / 🞎 No |
| If yes, which one: |  | 🞎 Basket preheating  🞎 Shaft (Fuchs, Quantum, ShARC)  🞎 Conti charging (Consteel, ECS)  🞎 … |
| Scrap basket volume | m3 |  |
| Max. lifting height of scrap b. | m |  |
| Number of baskets | [#] |  |
| Dust | [kg/t] |  |
| FeO in dust | [%] |  |
| Slag builder (CaO …%,  MgO …%  …. ….%) | [kg/t]  [kg/t]  [kg/t] |  |
| Slag | [kg/t] |  |
| FeO in slag | [%] |  |
| Tap to Tap time – average | [min] |  |
| Power On time | [min] |  |
| Tapping temperature range | [°C] |  |
| Target %C @ tapping range | [%] |  |
| Furnace diameter | [m] |  |
| Upper shell height | [m] |  |
| Tilting system | 🞎 cradle 🞎circular 🞎 hydraulic | |
| Housing | 🞎 Doghouse / 🞎 Elephant house / 🞎 open | |

1. **Target set-up:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Target production | [t/y] |  | | | |
| Scrap preheating | Yes, which … | | | 🞎 No | |
| DRI continuous supply | 🞎 Yes | | | 🞎 No | |
| With DRI preheating | Yes, … °C | | | 🞎 No | |
| RMH\*) autonomy | [days] | DRI … | SB … | | AM … |
| DRI bin | 🞎 Stand alone | | | 🞎 Part of RMH\*) | |

\*) Raw material handling (DRI / Slag builder (SB) / Alloy material)

1. **Consumption:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Unit | Av. consumption | Best value |
| Electrical Energy | [kWh/tLS] |  |  |
| Oxygen | [Nm³/tLS] |  |  |
| Electrodes | [kg/tLS] |  |  |
| Fuel: NG (CH4) | [Nm³/tLS] |  |  |
| LPG | [Nm³/tLS] |  |  |
| Bulk carbon (>20mm) | [kg/tLS] |  |  |
| Coarse carbon (<20mm) | [kg/tLS] |  |  |
| Injected carbon (0-3mm) | [kg/tLS] |  |  |
| Scrap | [t/tLS] |  |  |
| DRI / HBI | [t/tLS] |  |  |
| Pig iron | [t/tLS] |  |  |
| Hot metal | [t/tLS] |  |  |

1. **Secondary metallurgy:**

|  |  |  |
| --- | --- | --- |
| **LF:** |  |  |
| Heating rate | [K/min] |  |
| 🞎 **VD/** 🞎 **VOD:** (kindly tick) |  | 🞎 Single tank / 🞎 double tank |
| Treatment time | [min] |  |
| Vacuum production 🡪 RH |  | 🞎 Mech. pumps / 🞎 Steam |
| **CCM:** |  |  |
| Average casting time | [min] |  |
| Section range (…x… - …x…) | [mm/mm] |  |

1. **Dedusting System:**

|  |  |  |
| --- | --- | --- |
| **Primary** |  |  |
| Flow (approx.) @ … °C | [m³/h] |  |
| Power (booster fan) | [kW] |  |
| Suction pressure (max.) @ …°C | [mmWC] |  |
| **Secondary:** |  |  |
| Flow (approx.) @ … °C | [m³/h] |  |
| **Filter house** |  |  |
| Number of filter bags / cell |  |  |
| Number of cells |  |  |
| Bag length / active surface | [m]/[m2] |  |
| Pressure loss | [Pa] |  |
| **Off-gas suction** |  |  |
| Power / fan | kW |  |
| Number of fans |  |  |

1. **Auxiliary:**

|  |  |  |
| --- | --- | --- |
| **Cranes:** |  |  |
| **Scrap yard:** |  |  |
| Number of scrap yards |  |  |
| Number of OHC / scrap yard |  |  |
| Speed (length (x)/cross (y)/lifting (z)) | [m/min] | …/…/… |
| Lifting capacity (A) | [t] |  |
| Max. lifting height (A1) | [m] |  |
| Rail height (B) | [m] |  |
| Approach left / right (C1/C2) | [m] | / |
| Span between rails (D) | [m] |  |
| Grab size / el. magnet (tick if avail.) | [m3] | / 🞎 |
| Turnaround time | [sec] |  |
|  |  |  |
| **Furnace bay (scrap charging)** |  |  |
| Speed (length (x)/cross (y)/lifting (z)) | [m/min] | …/ … /… (main),…(aux) |
| Capacity main hook (E1) | [t] |  |
| Capacity aux hook (E2) | [t] |  |
| Number of cranes |  |  |
| Rail height (above ground) (F) | [m] |  |
| Left approach main hook (G1) | [m] |  |
| Right approach main hook (G2) | [m] |  |
| Left approach aux hook (H1) | [m] |  |
| Right approach aux hook (H2) | [m] |  |
| Span between rails (I) | [m] |  |
| Max lifting height (main hook) (J) | [m] |  |
| Max lifting height (aux hook) (K) | [m] |  |
|  |  |  |
| **Tapping/casting bay (liquid)** |  |  |
| Speed (length (x)/cross (y)/lifting (z)) | [m/min] | …/ … /… (main),…(aux) |
| Capacity main hook (L1) | [t] |  |
| Capacity aux hook (L2) | [t] | / |
| Number of cranes |  |  |
| Rail height (above ground) (M) | [m] |  |
| Left approach main hook (N1) | [m] |  |
| Right approach main hook (N2) | [m] |  |
| Left approach aux hook (O1) | [m] | … / … |
| Right approach aux hook (O2) | [m] | … / … |
| Span between rails (P) | [m] |  |
| Max lifting height (main hook) (Q) | [m] |  |
| Max lifting height (aux hook) (R) | [m] | … / … |
|  |  |  |

Scrap yard crane

C2

B

A

C1

A1

**?**

D

Charging cranes

**?**

G1

F

E1 / E2

K

J

**?**

H2

H1

G2

I

Tapping /casting cranes

R

M

L1 / L2

Q

**?**

O2

N1

**?**

N2

O1

P

Directions

X

Y

Z

|  |  |  |
| --- | --- | --- |
| **Bays:** |  |  |
| Scrap yard (width/length) | [m]x[m] | …/…/… |
| Furnace bay (width/length) | [m]x[m] |  |
| Height of hook-on at transfer car (S) | [m] |  |
| Height of furnace platform | [m] |  |
| Height furnace rim (upper shell) | [m] |  |
| Tapping/casting bay | [m]x[m] |  |
| Transport of ladle from EAF 🡪 LF by: |  | 🞎 ladle car 🞎 by OHC |
| Height of hook-on at ladle car (S) | [m] |  |
| Height of ladle furnace platform | [m] |  |
| Transport of ladle from LF 🡪 VD/CCM by: |  | 🞎 ladle car 🞎 by OHC |
| Height of vacuum station platform | [m] |  |
| Height of hook-on at vacuum tank (S) | [m] |  |
| Height of hook-on on turret at CCM (S) | [m] |  |
|  |  |  |
| **Transfer car:** |  |  |
| Speed | [m/min] |  |
| Travelling distance | [m] |  |
|  |  |  |
| **Ladle car:** |  |  |
| Speed | [m/min] |  |
| Travelling distance | [m] |  |

S

Required drawings: Plant layout (.dwg or similar)

Section view (EAF, RMH, steel structure,

Layout of RMH (.dwg or similar)

Scrap basket (.dwg or similar)

Thank you very much.

Please send the filled-in form to rvm@eco-eag.com