TERMS OF REFERENCE FOR THE R&D PROJECT

[Paints, Varnishes and its Related Products, Sectional Committee, CHD20, under Chemical Department, BIS]

1. Title of the project : To study the safety and performance parameters of Polysiloxane coatings

2. Background :

2.1 The rapid growth of Polysiloxane coatings is tied to their unique chemistry, which is a blend of organic, epoxy-based and inorganic, siloxane-based binder systems. This robust chemical structure enables the coatings to achieve the high-performance coating including excellent temperature resistance, good resistance to certain acids and solvents, superior long-term color and gloss characteristics of the coatings, and to resist the chalking, fading and corrosion that deteriorate traditional epoxy urethane, etc. systems after long periods of environmental exposure

2.2 In the country, the Polysiloxane coatings is being widely manufactured and used in Industrial coatings applications on refineries equipment, marine shipbuilding, steel bridges, etc., are all exposed to extreme weather conditions.

2.3 Internationally standards have been developed on the subject by organizations such as JIS, SSPC (now become AMPP) and further companies' specifications are also being used across the globe. Considering the trade and provide a confidence to users BIS has identified the subject for formulating the Indian Standard.

3. Objective:

To collect and analyse the relevant data and information from both primary and secondary sources in regard to safety and performance requirements of Polysiloxane coatings.

4. Scope:

4.1 Undertaking a comprehensive study and analysis of existing literature which includes available standards, technical regulations, research papers, any SoPs/guidelines/ instructions issued by the Ministries/ regulators concerned and any other relevant study

4.2 Studying the current usage of Polysiloxane coatings for various Industrial coatings applications.

4.3 Collection of data on scale wise manufacturing and user base, suppliers and vendors involved through government sources (website, reports, survey, etc.) and/or industry associations

4.4 Collection and analyses of import and export data for Polysiloxane coatings and conduct analytical study of the technical regulations on the product in various countries.

4.5 Conducting the comprehensive study on availability of test facilities in the country.

4.6 Collection of data on the following through visits to two industries each of larger, medium, small and micro scales and one each of government and NABL accredited private testing facility, in case the manufacturing and testing facilities data advises otherwise:

a) Types of raw materials

b) Varieties of the product

c) Manufacturing processes

d) In process quality control checks

e) Safety and quality parameters

f) In-house test facilities

g) Performance and safety parameters

h) Packaging, Marketing and labelling

i) Post quality checks parameters

j) Types of Sustainability practices being used such as energy consumption, renewable energy sources, sustainable practices, 3Rs (Reuse, Reduce and Recycle), waste management and disposal mechanisms, carbon footprints.

k) To undertake user feedback (criteria)

4.7 Collection of the samples and analysis of test reports as per mentioned sampling plan for the below given requirements and any other specific requirement claimed by manufacturer or user of the product;

4.7.1 Physical and general characteristics

a. Drying time
b. Consistency
c. Finish
d. Colour
e. Dry film thickness
f. Volume solid
g. Flash point
h. Fineness of grind
i. Gloss value
j. Mass in Kg/10 litre
k. Theoretical spreading rate
l. Viscosity
m. Volatile organic compound (VoC)
n. Lead and toxic heavy metals

4.7.2 Durability Characteristics (tested on accelerated equipment's):

a) Chalking
b) Checking
c) Cracking

d) Flaking
e) Spotting
f) Blistering
g) Corrosion
h) Fastness to light

4.7.3 Mechanical characteristic
a) Abrasion resistance
b) Adhesion & compatibility
c) Impact Resistance
d) Resistance to galling

4.7.4 Other specific functional characteristics
a) Thermal resistance
b) Acid resistance
c) Non-stick
d) Non-wetting
e) UV resistance

4.8 Preparation and submission of the analysed study report covering the entire scope of the project.

5. Research Methodology:

5.1 The project will involve the following research methodologies:

a) Study the literature and analyse it in respect to the scope

b) Survey the market through structured questionnaires for collecting information in respect to the scope

c) Contact the relevant organizations (e.g. EICs) and associations (Industry/ user associations) for gathering the data

d) Visits to the manufacturing units to observe:

i) manufacturing processes,
ii) in-process controls,

e) Discussion with focused groups (Quality control personnel and person responsible for manufacturing) through structured questionnaires

f) Collection of samples – samples to be collected during the visits to industries as per sampling plan

g) Testing of samples – test the samples and submit the analyzed results (**Samples shall be tested in BIS recognized laboratories/ laboratories of national repute).**

5.2 Comprehensive reporting on all aspects

6. Sampling Plan:

6.1 Visit to two industries each of large, medium, small and micro scale to understand and collect data from the manufacturers and organizations involved in manufacturing of Polysiloxane coatings, unless the manufacturing database indicates otherwise.

6.2 Visit to one govt and one private lab (preferably NABL accredited or BIS recognized lab) to have information on characteristics tested and methods of tests used, unless the testing laboratory database indicates otherwise.

7. Deliverables:

7.1 A comprehensive report consisting outcomes of the study covering all aspects of the scope both shall be submitted in both paper and digital formats.

7.2 Along with the final report the survey formats and responses, questionnaires, results of testing, reports of visits, other relevant documents/ information to be appended

8. Delivery Milestones and Review Process:

8.1 The duration of the project shall be three months.

8.2 An interim report indicating the review of the literature, desktop research and sampling plan shall be submitted in 15 days from award of the project.

8.3 Draft report shall be submitted by the end of two months from award of the project. This report may not wait for receipt of final test reports of samples.

8.4 Final report shall be submitted within 90 days.

9. Support from BIS:

BIS will provide access to latest available editions of Indian standards and/ or international standards

10. Nodal Point

Shri Pushpendra Kumar, Scientist B & Member Secretary, CHD 20 may be contacted for more clarification on the R&D project (chd20@bis.org.in)