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Construction in Kosovo Growing Opportunities for Kosovo Building Materials Manufacturers

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CONSTRUCTION IN KOSOVO

GROWING OPPORTUNITIES FOR KOSOVO BUILDING MATERIALS MANUFACTURERS

Kosovo Private Enterprise Program, Project: "Construction in Kosovo, Growing Opportunities for Kosovo Building Materials Manufacturers".

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CONTENTS

PURPOSE OF ASSIGNMENT.....	1
BACKGROUND	2
EXECUTIVE SUMMARY	3
FIELD ACTIVITIES TO ACHIEVE PURPOSES	5
FINDINGS.....	7
CONCLUSIONS AND RECOMMENDATIONS.....	14
ANNEXES.....	19

PURPOSE OF ASSIGNMENT

The purpose of this short-term technical assistance (STTA) assignment was to determine needs and prepare a roadmap to improve the building materials sector, and to:

- Provide an overview of the current status of the construction sector with a special emphasis on the status of the building materials manufacturing sub-sector.
- Map the building materials value chain, interview the participants conducting activities in the value chain and assess the effectiveness of their operations while identifying obstacles and opportunities for improvement.
- Recommend strategies and activities that can be initiated by KPEP to support the sub-sector with technical and other assistance as determined to make the sector more competitive, increase local sales, employment and investment with the overall goal of
- Reduce the Kosovo construction sector's dependence on imported materials and products and increase the export potential of the Kosovo building materials manufacturers.

BACKGROUND

The USAID Kosovo Private Enterprise Program (KPEP) was initiated in September, 2008 by Booz Allen Hamilton (BAH). The program is designed to build on the success of earlier USAID projects for Kosovo and to positively impact the Kosovo economy through lasting improvements in private sector competitiveness.

KPEP includes four main components:

1. Private sector support in targeted sectors with potential for growth and competitiveness.
2. Identify demand driven development for business support services.
3. Improve the business enabling environment.
4. Workforce development.

One targeted sector that was pre-identified for KPEP was construction. The construction sector is a major component to the Kosovo economy with important secondary impacts on many related sectors. Two sub-sectors of construction included road construction and building materials. Early efforts were to concentrate on concrete producers but even though concrete and other cementitious materials are probably the most widely used category of building materials used in Kosovo, it became apparent to KPEP that a broader approach that would include assistance for building materials manufacturers of all types of products would be more effective. Therefore, an STTA was created that would make an effort to look at the entire sector.

The Statement of Work directed the assessment team to concentrate primarily on determining which materials are currently being locally manufactured and evaluate the competitiveness of these manufacturers. Additionally, the team was asked to include architects, design engineers, and builders in scope of their study in order to provide perspective from those who select and specify the materials for projects as well as those who purchase and install them. This proved to be a comprehensive approach to this sub-sector that resulted in a more reliable overall picture of the construction building materials value chain.

KPEP chose to recruit an STTA for this assignment who brought experience with international best practices. The technical assistant was teamed with a local construction sector expert who had experience with the current landscape of the Kosovo design and construction industry. This proved to be a very beneficial strategy because the team was able to leverage the knowledge of the local expert to provide contacts, advice, and ready translation (particularly when dealing with technical terminology, as well as to bring a depth of local insight that the STTA would have taken significant amounts of time to acquire.

EXECUTIVE SUMMARY

This study examined the young and still relatively inefficient construction sector of the post-conflict Kosovo economy. The study revealed very few surprises but serves to provide informed insight into the significant number of barriers and opportunities for both the sector as a whole and to the building materials manufacturing sub-sector in particular.

Vigorous and significant building construction activity in Kosovo is currently underway and has been completed in the recent years since post-conflict reconstruction began in about 2000. This sustained level of activity, in terms of sheer volume, has overwhelmed the capacity and capability of all of the private enterprise support and public regulatory systems necessary for it to perform with quality and efficiency. This study is dedicated to one primary aspect of support for this vigorous market activity and that is building materials manufacturing. We define building materials manufacturing as all firms engaged in the production and assembly of construction inputs, such as cement, clay bricks and block, pre-cast concrete items, wood joinery and carpentry, clay roofing tiles, sheet metal, wood flooring, and the like. However, this study cannot and does not ignore the broader construction sector and how its processes and activities, from design to completed works, affects the successful operations of building materials manufacturers.

For the most part, building materials manufacturers do not produce goods that are purchased by the broader retail consumer market. That is not to say that some portion of their products are not purchased by retail customers such as home owners, small business owners, and other individuals who are involved in minor construction, repair and rehabilitation activities; rather this distinction emphasizes that building materials manufacturers must concentrate on the construction sector of the economy (that is, the small, medium and large-sized building contractors serving the public, institutional and commercial building markets as well as major residential developers) as their most important segment of the market. This segment is very well informed and is largely composed of sophisticated buyers, so to be competitive in this market, building manufacturers must have the knowledge and business acumen to communicate with and sell their products. Those who do not or cannot serve this portion of the market will suffer a significant loss of market share to other producers, whether they are importers or local competitors.

While still mostly immature, the construction sector has enormous opportunity to provide jobs and revenue growth within the Kosovo economy. Provide data to back it up about size of sector in terms of revenues, etc. Although reliable data is difficult to obtain, given the recent and continuing investment in public infrastructure (projected 100 and private commercial ventures even in the face of a global recession we can only expect construction investments to continue in the country. Therefore there is opportunity for locally produced building materials to thrive in the domestic market. Over the long-term, well functioning manufacturers could build opportunities to sell to external markets such as other Balkan countries, and Europe, both Eastern and Western. That being said, quality assurance is a critical impediment to sub-sector growth. Higher quality imported materials currently threaten the competitiveness of locally produced materials that could otherwise offer a cost-effective alternative if they can be shown to meet the same quality standards as imports. Local manufacturers can also deliver goods to Kosovo building projects with less shipping time and expense that are tailored to the needs of the Kosovo market. In order to overcome such constraints, market actors involved in the building materials sector have the opportunity to cooperate to strengthen quality assurance and quality control processes within their respective value chain. For these reasons many of the recommendations included in this study emphasize education, training, and cooperative learning.

Although the recommendations provided in this study are mostly designed to have long-term positive effects on the value chain, many of the actions can and should be implemented without delay. We often refer here to a largely theoretical group of individuals who exist in this study as participants, stakeholders, or attendees; however, we are really referring to practitioners whose day-to-day activities and business and personal livelihoods, not to forget those of their present and future employees can be positively influenced by the actions recommended in this report.

FIELD ACTIVITIES TO ACHIEVE PURPOSES

Methodology

In July-August 2009 the KPEP program fielded an international construction sector specialist to work with the program team to assess and analyze Kosovo's building materials sector. The approach to this project was primarily qualitative in nature. Although we undertook some fundamental analysis of quantitative import and export data available from Kosovo Customs, it was utilized to inform the problem statement. Therefore, we relied primarily on interviews and conversations from face-to-face meetings with stakeholders in the Kosovo building materials manufacturing value chain. In total, the team conducted over 25 interviews and one focus group/workshop and reviewed a number of secondary sources of data. When possible, quantitative estimates of measurable data that emerged from the interviews were recorded if it could be reasonably extrapolated and verified as appropriate. Other unsubstantiated quantitative data was recorded in KPEP project notes for later follow up and substantiation.

These field activities were designed to

- Define common trends, obstacles and barriers throughout the value chain.
- Identify opportunities for competitiveness improvement for participants in the value chain.
- Identify opportunities for overcoming barriers inherent in the current operations of value chain stakeholders.
- Recommend a set of implementable interventions for KPEP to assist, support, and invigorate the value chain.

The design for field activities included the following steps:

- Research/analyze quantitative data on imports/exports of building materials obtainable through the Kosovo Customs. This was the most reliable quantitative data available to us.
- Investigate and map the building materials value chain throughout the construction sector of the economy.
- Identify the participants and stakeholders in the building materials value chain.¹
- Conduct interviews and meetings with value chain participants, including:
 - building materials manufacturers (producers)
 - architects & engineers (specifiers)
 - contractors, design-build firms, investors/developers (end users)
 - government Ministry representatives (regulators)
 - banks (financiers)
- Identify linkages and dependencies within the value chain.
- Investigate and gauge the strength of communication links and information transfer between the participants in the value chain.

After these steps were completed, we gathered participants and stakeholders in the building materials value chain in a face-to-face workshop setting. Attendees were identified during the interview sessions and were invited to attend a facilitated workshop for which there were two primary goals:

- To brainstorm, discuss, inform, validate, and prioritize obstacles and opportunities for Kosovo building materials manufacturers.

¹ Raw materials producers and processors were not included for logistical reasons.

- To provide stakeholders with a positive example of how effective business-to-business communication and mutual collaboration can help them to resolve common challenges for the benefit of the entire value chain.

FINDINGS

THE CONSTRUCTION SECTOR

Vision

Like any well functioning construction sector, a vision for a vital and competitive Kosovo construction sector would have the following attributes:

- Strong, inclusive community and infrastructure planning that emphasizes long-term sustainability and anticipates future growth.
- A design and engineering industry that interprets and articulates the needs of the nation in terms of its built environment while dedicating itself to protection of public health and safety and the natural environment of Kosovo.
- Builders that share the vision of a high quality and sustainable built environment and that are willing to embrace a strategy of long-term benefits for both their own enterprises and the communities who comprise their markets.
- Manufacturers and producers of construction materials that meet quality standards and other market-based demands to make Kosovo-produced building products and materials preferred locally as well as outside the country.
- A government regulatory system that reflects the values of the community, protects the health and welfare of its citizens and their long term well-being, and supports a business environment that leverages competitiveness and efficiency to result in high quality constructed works and communities.

In the near future, quality assurance and quality control standards and methods stand out as the most relevant factor to the sector's competitiveness. Under this future vision, designers and engineers articulate standards of quality and determine quality control procedures for projects; builders buy-in to the requirements of rigorous independent quality control; and manufacturers are able to produce documented assurance that their products meet quality standards. Given time, well-designed assistance, support, planning, and education, this vision for the Kosovo construction sector is achievable.

Discussion

Compared to the construction industry in most developed countries, the construction sector of the Kosovo economy is young, immature, and heavily influenced by opportunists who are anxious to achieve short term gain in a very vigorous market. This assessment is not intended to be a broad condemnation of the design and construction industry in Kosovo; rather it is the result of many different forces at currently affecting the market.

First, the market demand for new building construction of all types is outpacing the ability for the design and construction industry to develop effective checks and balances processes that regulate and control construction and development. Second, construction forces (small, medium, and large builders of all types) generally lack the requisite management experience and knowledge of the processes, procedures, and contract administration needs that are second nature to international firms working under standards of "best practice". Thirdly, the architectural and engineering design portion of the industry is underdeveloped somewhat inexperienced and is not supported by formal professional occupational licensure.

Most of the actors in the construction sector seem to be conducting their business operations intuitively. No one company or government body was found that possessed enough reliable data on which to base strategic projections for future business or activity in Kosovo. Builders and developers claim to have clients who are willing to continue investing

in their projects and they also claim that a never-ending stream of buyers is coming through the doors of their sales offices for residential apartments and other buildings. Where is all the capital for these investments coming from and who are the buyers of these developments? Is this purely speculative investment or are there real and lasting investments potential that exist in Kosovo real estate and developments? These are not questions that will be definitively answered by this study but must be acknowledged as influencing current and future market conditions for construction works and the building materials and products required for those works.

Large amounts of funds for reconstruction were donated to Kosovo after the end of the conflict in 2000. Additionally, in many of our interviews the popular view that the Kosovo diaspora are bringing capital from outside the country to invest in their homeland by purchasing homes, apartments, commercial developments and other real properties of all types. This combination of forces has created a continuous demand for construction works that has outpaced effective community planning and appropriate government regulatory controls.

The Ministry of Trade and Industry has no data on the volume or value of construction currently underway in the country. This is probably attributable to the fact that usually only high-profile and government projects are acquiring building permits. International best practices, if followed, would dictate that every project over a certain minimum sum is required to have a building permit and that the property investor/owner pays a fee that is linked to the value of the work or project. In Kosovo (at least in the Municipality of Pristina) the fee for a building permit is based on the physical volume or area of the building, which is then additionally categorized by a geographic zone. This type of schema for building permit fees results in two different disincentives:

- High value works such as luxury apartments, retail space and offices pay a building permit fee that is equivalent to that of a lower value project such as a warehouse or residence, if it is built in the same zone.
- The high fees for permits cause many investors to build their projects without obtaining a building permit at all.

The research indicated that approximately 60 – 80% of the construction activity underway in Kosovo is “illegal”; that is, that the work is being conducted without a building permit from the local authorities with jurisdiction. We attribute this to the notion that there are few if any local building officials with any real jurisdictional power and few effective regulatory or judicial authorities in place to back them up if they actually attempted to enforce their own interpretations of very subjectively written construction laws.

Another important consequence of this system is that the relative value of the construction work is not ascertained when a building permit is issued. The value then remains hidden until some date in the future when the property is appraised for sale. It was not surprising that neither building regulatory officials nor others within government ministries could easily determine the actual value of construction works currently underway in Kosovo.

Obstacles and Concerns

The prevalence of non-existent and ineffective processes and practices in the construction sector are significant and is clear evidence of the lack of the checks and balances previously mentioned. Among these are a weak judiciary system (making contract provisions difficult to enforce), no required licensing for practicing individual architects and engineers, difficulties with enforcing building codes and inspection requirements, poor professional representation for investors and owners during the construction phase of projects, and incomplete construction drawings and written technical specifications that often leads to poor quality control practices during construction.

While some of these obstacles may appear daunting and will require sustained long-term effort to resolve, there are a number of shorter term measures included in the Recommendations that follow that can begin to address these challenges and build the competitiveness of the sector.

Opportunities and Positives

Despite challenges to the construction sector at nearly every level, a number of positive factors and opportunities exist. The continued vigor of the construction market is the most important positive factor. Although limited data exist that expresses current construction activity, all indications are that the market remains very active; this is true in spite of the global slowdown in the economy over the last two years.

Also, the assessment team found a number of “pockets of excellence” in the construction sector where well-intentioned and well-qualified groups of actors are working together to efficiently design and construct high-quality building projects.

And finally, in spite of limited qualifying data, the volume of construction work that has been completed is simple but obvious evidence that the means and methods to facilitate building construction exist in Kosovo but that the capacity, capability, processes and controls needed to produce completed works of consistently good quality must be introduced and implemented.

THE BUILDING MATERIALS MANUFACTURERS SUB-SECTOR

Kosovo Customs records data that tracks the value of imports and exports. Analysis of this data indicates that over €100M per year of goods and materials used in construction are imported each year with a corresponding amount of exports of the same classifications of products valued at approximately €4M. This reliable indicator, taken alone, should signal a degree of concern at the amount of the imbalance; however, it also signals significant opportunity for the Kosovo economy and KPEP. Additionally, builders and architects interviewed for this project estimate that up to 80% of the construction materials and products used on any given project are imported.

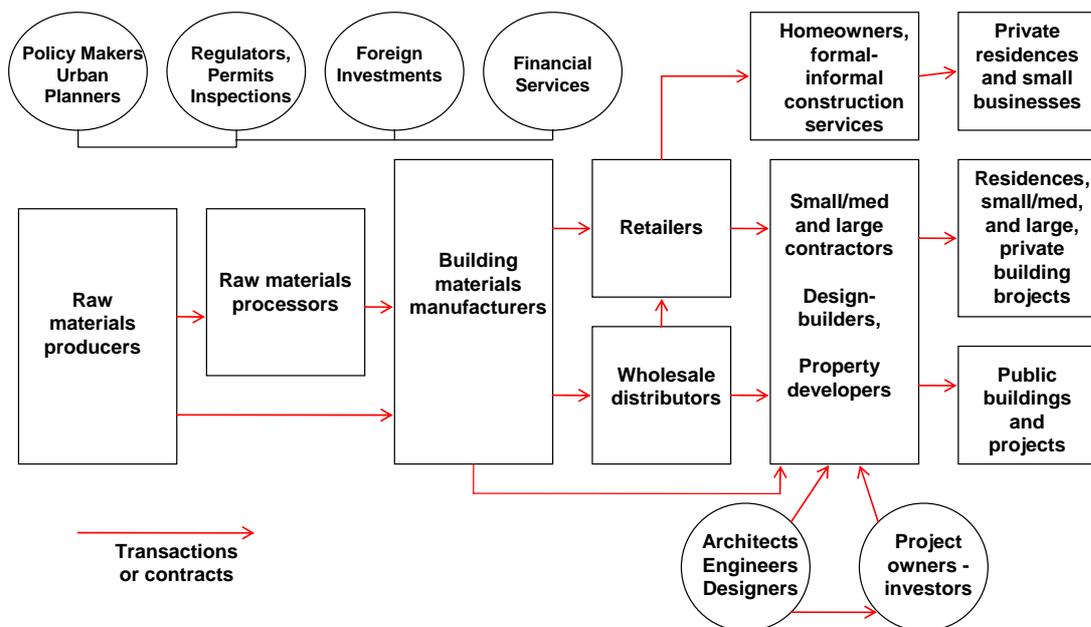
While the assessment team interviewed a large number of construction sector actors, this assessment focused on the building materials sub-sector because any positive effort that can upset the building materials trade imbalance can have significant multiplier effects on the broader economy. It is a well accepted fact that the construction sector of the economy in a post-conflict country is a major contributor to broader development by providing jobs through the rebuilding of infrastructure, housing, and the commercial development that will follow if political stability is established. Add to this the positive economic effect of leveraging the country’s labor, industry, and raw materials sources to create added value to the 100’s of various materials and products used by the construction sector and the results will ripple throughout the economy.

Moreover, this analysis primarily examines building materials manufacturers because it was found that these manufacturers are capable of competing with imported materials in price, quality, and availability—provided that they possess the basic technical skills and general business know-how. Properly designed assistance efforts and interventions will help them to strategically place their business enterprises in the mainstream of the Kosovo construction sector and will generate long-term positive economic impact for the Kosovo economy.

The Building Materials Value Chain and Constraints to Quality Assurance

Locally produced building materials generally suffer from a having a reputation for low quality and they generally lack the ability to prove that they meet basic manufacturing standards. The following section summarizes the major factors along the value chain that constrain the sector from developing higher quality materials and thus more effectively competing in the Kosovo and global markets.

Construction Building Materials Value Chain Map



Information Transfer: When considering the value chain map above, the assessment team found that the Kosovo building materials value chain is very similar, if not nearly identical, to the building materials value chain found the construction sector markets of other countries. Some of the contract/transaction linkages need to be strengthened but it is important to note that there are also needs for creating new linkages to strengthen their communication and information transfer and are not necessarily transactional. For example, a critical link that needs to be strengthened is the information transfer between architects, engineers, and designers and the building materials manufacturers. Although there are normally no contracts or transactions that take place between these two groups of participants, without adequate technical information exchange, the designers may not know enough about the materials to properly incorporate them into the design of the project and the manufacturers may not understand the needs of the market that they are serving.

This information transfer is critical because a primary duty of a professional designer (architect or engineer) is to select the products and materials that will be used for the project by producing the written technical specifications. The specifications are the qualitative requirements for the products, materials and construction systems that will be utilized for the project. There must be a consistent flow of technical information in the building materials value chain between designers and building products manufacturers.

Market Information: Additionally, the building materials manufacturers sector generally lacks marketing acumen and a basic knowledge of the markets they serve and their customer’s needs. Except for general business associations such as the Kosovo Chamber of Commerce and the Kosovo Business Alliance, the building materials manufacturers mostly lack active business associations that represent their common interests and needs.

There is an association of concrete producers but for most other categories of materials, there is no industry association that binds them.

Architectural and Engineering Licensing: Currently business licenses for architectural and engineering licensing are issued to firms and not to individual professional practitioners. The result is that there are no minimum standards of education, experience or certification required in order for an individual to use the title of “architect” or “engineer”. Another potential result is that entrepreneurs can form design companies and employ under-qualified individuals to produce project designs resulting in unsatisfactory or unsafe projects. Many investors and project owners usually do not possess the technical expertise to determine whether or not they are receiving satisfactory and appropriate services that will result in a quality completed project that is appropriate for their needs.

Testing Laboratories: Currently there are no independent accredited materials testing laboratories in Kosovo. Materials testing laboratories exist in Kosovo but there is no independent regulation, accreditation or regular system of independent calibration or inspection of records or other processes that are necessary under best practices. In one case, our findings revealed that a construction company has a partial financial interest in its own testing laboratory. In addition, some materials manufacturers are under the impression that their own in-house quality control testing is appropriate for adequate quality assurance. The Ministry of Trade and Industry is currently working towards the goal of establishing an standards administrative structure that would create “KK” (Kosovo conformity) certification that is intended to parallel the “CE” (European conformity) certification. If successful, it is hoped that this should make Kosovo produced building materials who achieve the KK certification equivalent to those with the CE certification. This is laudable; however MTI’s actual progress towards achieving this goal should be monitored. Simply adopting a standard does not mean that the standard will be able to be implemented or that manufacturers who claim to comply with the standard actually comply with the standard.

Currently, most Kosovo building materials manufacturers provide their own testing as an internal quality control process. When requested they use this data to provide quality assurance for customers. They may also claim, e.g., in their marketing materials, that they are in compliance with certain manufacturing standards that are applicable to their products. However, this may or may not be a true claim; without independent testing, the manufacturer’s quality assurance means very little to the professional designer or builder. Also, without independent verification that their products meet EN standards, finding export customers outside of Kosovo is problematic.

Building Materials Selection Analysis and Rankings

Building materials as categorized by import/export data were analyzed and rated in accordance with the following weighted criteria:

- Demand or market potential
- Outside investment potential
- Return on investment relative to other building materials
- Presence of qualified lead firms with requisite management experience
- Sufficient physical infrastructure
- Availability of sufficient quantities of raw materials (or processed raw materials)
- Dependency on imported (or imported processed) raw materials
- Investment in resources required to introduce, rehabilitate or improve manufacturing capacity
- Ability to establish a successful model within the project timeframe (3 yrs.)
- Availability of skilled manufacturing and/or installation labor
- Secondary effects – multiplier potential

This resulted in a ranking of basic building materials that are currently imported that have the highest potential for support and improvement that could result in import replacement and increase exports. Although this is revealing data, it is based on informed but subjective observation of the building materials sector and is not intended to replace systematic market research. These rankings are intended to serve as one source, but not the only source, of critical information to help identify building materials manufacturers for KPEP assistance.

The rankings of the top 13 out of 23 building materials categories analyzed (all those with scores above 40 out of a possible maximum of 90) are as follows:

	RANKING	SCORE
1	Clay brick and block	60
2	Cement	58
3	Concrete items (pre-cast)	53
4	Wood Joinery & Carpentry	53
5	Clay Roofing tiles	50
6	Sheet metals	50
7	Wood Flooring	48
8	Paints & Varnishes	47
9	Gravel aggregates	47
10	Wood Lumber	47
11	Ceramics (tiles, etc)	43
12	Stone	42
13	Steel Reinforcement	42

Please see the annexes for a complete rankings matrix of all selected materials categories.

OPPORTUNITIES AND POSITIVES IN THE BUILDING MATERIALS MANUFACTURING SUB-SECTOR

The team identified a number of various positive characteristics of the current business/construction sector environment that could potentially favor building materials manufacturers and new investments in products or plant and equipment:

- Wages in Kosovo are generally lower than in competing countries that have created opportunities for some building materials manufacturers to concentrate on products that require greater amounts of labor and less reliance on automated processes. For example, the team interviewed one manufacturer who is importing sheet metals in bulk that then being hand-crafted into high quality roof gutter systems, roofing accessories and piping, that are then being exported to western European countries.
- Recent changes to government regulations has removed customs duties from many raw materials or processed raw materials that are being incorporated into manufactured products. This is not true for all processed raw materials, but the situation is gradually improving.
- The Kosovo transportation and power infrastructure is slowly improving as more roads are completed or upgraded and the electrical grid is rehabilitated. This can reduce the basic costs of operation to building materials manufacturers and the construction sector more broadly.
- KEK (the Kosovo electric utility) has developed a tiered rate system where heavy users (industrial) may opt to pay 2 months in advance for electrical power and thereby be guaranteed nearly uninterrupted service. Although this system remains

out of reach for smaller building materials manufacturers, especially those that may not be located near the core of the electric grid; this arrangement has caused substantial improvements for those manufacturers who have been able to take advantage of it.

- The Department of Construction within the Ministry of Trade and Industry (MTI) is establishing the Construction Institute that will contain testing laboratories, accreditation bodies, conformity inspection bodies and a training center. The regulatory reference they are working under is EU regulation 89106. The Standardization Agency within the MTI, through its Technical Committee for Construction is adopting and approving related EU standards on construction materials.

These positive factors should be reviewed and considered in all present and future efforts to improve the performance of the building materials manufacturing sector.

CONCLUSIONS AND RECOMMENDATIONS

It is worth noting that this report initially anticipated narrowing its recommendations to focus on developing one or two specific value chains within the building materials sub-sector. The study revealed, however, that the greatest opportunity for growth in Kosovo's building materials sector lay not necessarily with the improvement of a specific value chain for a specific category or type of product or materials, but rather in the growth of a handful of lead firms with the vision, management, and commitment to quality that would enable them to compete in higher-value markets. The previous section of this report ranks several value chains that offer greater growth potential than others. That being said, this report recommends that the KPEP program focus on building a handful of lead firms within several of those chains, as they have the real potential to capture greater market share and potentially compete on a global scale.

RECOMMENDATIONS FOR THE CONSTRUCTION SECTOR

The following recommendations for the construction sector respond to the need to improve quality assurance/quality control methods and processes by strengthening information gaps between value chain actors. They are:

1. Support business-to-business (B2B) meetings and professional development opportunities in collaboration with the Kosovo Association of Architects (KAA) to facilitate communication between and provide learning opportunities for designers, building materials manufacturers, and builders. It is recommended that KPEP undertake a joint effort to work with the KAA to help them develop a program of education topics that addresses issues common to and of possible interest to all members of the construction sector. This will help simultaneously meet the need for B2B exchange opportunities, facilitate professional development for practitioners of all types in the construction sector while at the same time strengthening and lending credibility to the KAA.

KPEP can implement this program by

- Issue a sub-grant competition for a local organization (such as KAA) to develop a schedule for these B2B opportunities and a communications and publicity program to promote each event, seminar or education session. A comprehensive roster of Kosovo architects, engineers, builders, and building materials manufacturers should be compiled so that marketing and publicity efforts for attendance can be appropriately targeted. This publicity/communication effort should also be a cross-border effort to strengthen communications links between similar interests in the region.
- Assist the local organization in finding subject matter experts, speakers and trainers appropriate to the topic. These individuals should represent local expertise to the extent possible. When local expertise is not available, support should be provided to bring experts from the region or Europe who can be paired with a local counterpart to develop the curriculum or subject.
- Each B2B event should be scheduled to effectively address the subject to be covered. These could range from 1 or 2 hour presentations during a luncheon to a multiple-day seminar depending on the requirements of the topic and the training design.
- The list of potential topics for B2B activities is extensive but should attempt in all cases to address obstacles and challenges for the construction sector in Kosovo. These challenges should be compared and contrasted with international best practices. Potential topics may include:

- Building codes
- Manufacturing and other reference standards
- Criteria for design documentation (drawings and specifications)
- Standard written technical specification formats
- Specifying quality assurance and quality control procedures
- Developing/adopting a model contract for construction
- Alternative dispute resolution methods
- Developing effective trade and industry associations
- Developing a cross-disciplinary association similar to the North American-based Construction Specification Institute or similar associations in European countries.
- Other topics and issues as they apply to the design and construction industry

RECOMMENDATIONS FOR THE BUILDING MATERIALS SUB-SECTOR

These recommendations for the building materials sub-sector are designed to enhance quality assurance with respect to their product lines through training and information sharing. The recommendations are followed with suggestions for specific activities that are intended to be implementable yet flexible since they may need to be adjusted according to the needs of the specific individual, company, business association and future circumstances.

1. A series of professional development education and training opportunities should be facilitated to provide a selected group of building materials manufacturers with the training to assist them in the improvement of product information and marketing. This professional development training should be designed by professional technical trainer for the construction industry (in an STTA capacity) who will work with a KPEP coordinator to:

- Develop criteria to recruit and select appropriately qualified manufacturers using a Request for Applications format (RFA), an interview vetting process, and a Memorandum of Understanding (MOU) to ensure participation.
- Develop a roster of attendees with contact information.
- Determine the schedule of training sessions, locate a meeting/training space, and develop a simple topics schedule and training synopsis for dissemination to participants.
- Locate and engage subject matter experts or trainers for each session. Utilize local expertise to the maximum extent possible or couple local experts with international experts as required to facilitate effective learning outcomes.
- Session topics should be related to the following needs of the sector:
 - Improve the quality and content of the technical information needed by designers and contractors that is necessary to specify and utilize the manufacturer's products correctly and effectively. A professional construction specifications writer, engineer, or technical writer experienced with the content and standard format of such information should be engaged to help the manufacturers develop effective and informative product "cut sheets". 'Cut sheets' usually contain such information as:
 - Design criteria
 - Physical/structural properties
 - Other properties such as sound transmission, fire resistance, thermal performance, coefficients of expansion, etc.
 - Product handling and storage information.
 - Written and professionally illustrated installation procedures.

Samples of cut sheets for some various construction products are included in the annex to this report.

- Improve manufacturers marketing approach directly to designers and design/builders and increasing the flow of technical information between them. A professional architect and/or design engineer should be engaged to explain how best to market building products to design professionals and builders. Included would be such topics as
 - Arranging and conducting product information sessions at the offices of firms and companies.
 - Creating product samples presentations, color boards, etc.
 - Developing product brochures and catalogs (designed for marketing and not for repeating information that is on cut sheets)
 - Participation in trade fairs.

- Soliciting feedback from customers on product performance.
 - Soliciting information from designers and builders on their needs for new products.
 - The importance and development of means for maintaining regular contact with designers and builders to strengthen relationships.
 - Website development for dissemination of all types of product information including cut sheets, product catalogs, color selections, company information and services, CAD drawings showing installation details that can be downloaded for incorporation of the products into the project design documents, etc. Many excellent examples of North American-based building product manufacturer's websites can be accessed through the portal website www.4specs.com. It should be stressed that use of internet websites is the dominant method for used by designers and builders for finding product and technical information.
- Establishing technical experts or teams within the manufacturer's own companies to furnish on-site assistance and training for the installation of their products. There are existing Kosovo-based manufacturers who currently provide these types of services for their customer base. It is recommended that a technical representative from one of these existing companies is engaged as a subject matter expert to train others in the manner in which these services can be initiated and operated within their own companies.
 - Provide assistance and training to help building manufacturers conduct market research to expand and improve their product offerings. Engage a local expert in marketing and/or a marketing consultant to provide a training session or series of sessions for building materials manufacturers in the techniques of conducting market research for their particular products.
2. Establish a website portal (perhaps modeled after the previously mentioned www.4specs.com) that provides links to Kosovo building materials manufacturer's websites. KPEP should implement this recommendation using the following guidelines:
- Commission a rapid marketing study to determine the demand for such a site by building contractors, design architects and engineers, the functionality of the site, as well as willingness/ ability of building manufacturers to subscribe.
 - The web portal should be designed and managed by a website consultant/contractor who can monitor the building materials manufacturer's websites for appropriate content and can provide advice and assistance to those manufacturers for suggested improvements in both website content and graphical design.
 - The webmaster of the portal can charge a nominal monthly subscription fee to manufacturers who wish to have their website link and company logo published on the website portal.
 - KPEP should provide consulting assistance in the development of a marketing strategy for the website portal to make design and construction firms aware of its existence and benefits.
3. A strategy should be developed and implemented by KPEP to help selected Kosovo building materials manufacturers achieve certification under applicable European standards. The lack of ability to meet "CE" (European conformity) was cited by the manufacturers interviewed for this study as the most common obstacle to increasing their export potential. Obviously however, simply meeting conformity standards does not necessarily trigger a market for the exported products and will require market research and a business plan in order to justify the investment.

It is recommended that an STTA be engaged for this effort who will

- Conduct market research to determine which building materials that are currently manufactured in Kosovo have export potential.
- Determine which Kosovo building manufacturers have the requisite management expertise and the capacity to undertake a serious effort to expand sales of their products outside Kosovo and recommend some number of manufacturers or specific products or materials to be part of this program.
- After the local manufacturers are selected and the products identified that have export potential, research must be conducted to determine which manufacturing standards must be met for each product and how and if meeting the standard(s) is achievable.
- A plan would then be developed that could include:
 - Sending samples of both finished products and raw materials to independent accredited testing laboratories outside of Kosovo.
 - Bringing testing technicians from those accredited laboratories to the manufacturer's facilities to test and observe the manufacturing processes and plant and equipment (as required).
 - Provide a cost estimate to support these efforts.
- Development of business plans worthy of support and determining where the resources for such support may exist.

Proposed Alternative: The above recommendation could be determined to be too ambitious and lengthy for a single STTA. If so, a recommended alternative is to engage an STTA to undertake a feasibility study which would concentrate on the first two items in the bulleted list above: market research and the identification of appropriate building materials manufacturing firms and specific products worthy of support. If the results of the feasibility study indicated positive potential for increasing exports, the balance of the recommendation should be implemented for those manufacturers. Once the feasibility study work is concluded, KPEP could consider issuing a one-time subsidy for a competitively selected group of manufacturers to obtain certification, and then decide in subsequent years whether the venture is worth continuing for other firms.

4. In order to address the constraints regarding architectural and engineering licenses discussed on page 10, help to guide the formation of regulations for a system of professional occupational licensing for architects and engineers. If the necessary expertise is not in place on the current KPEP staff for this task, it is recommended that an (STTA) be engaged to guide this effort; this is particularly important because of the legal/regulatory advocacy efforts that are anticipated to be successful. It is highly recommended that this be a joint effort with the Kosovo Association of Architects (KAA). After a licensing regulation is in place, a combination of education, practical (internship) experience, and certification exams will be required for professional architects and design engineers to obtain licenses to practice and will result in overall improvements in the quality of designs and written technical specifications.

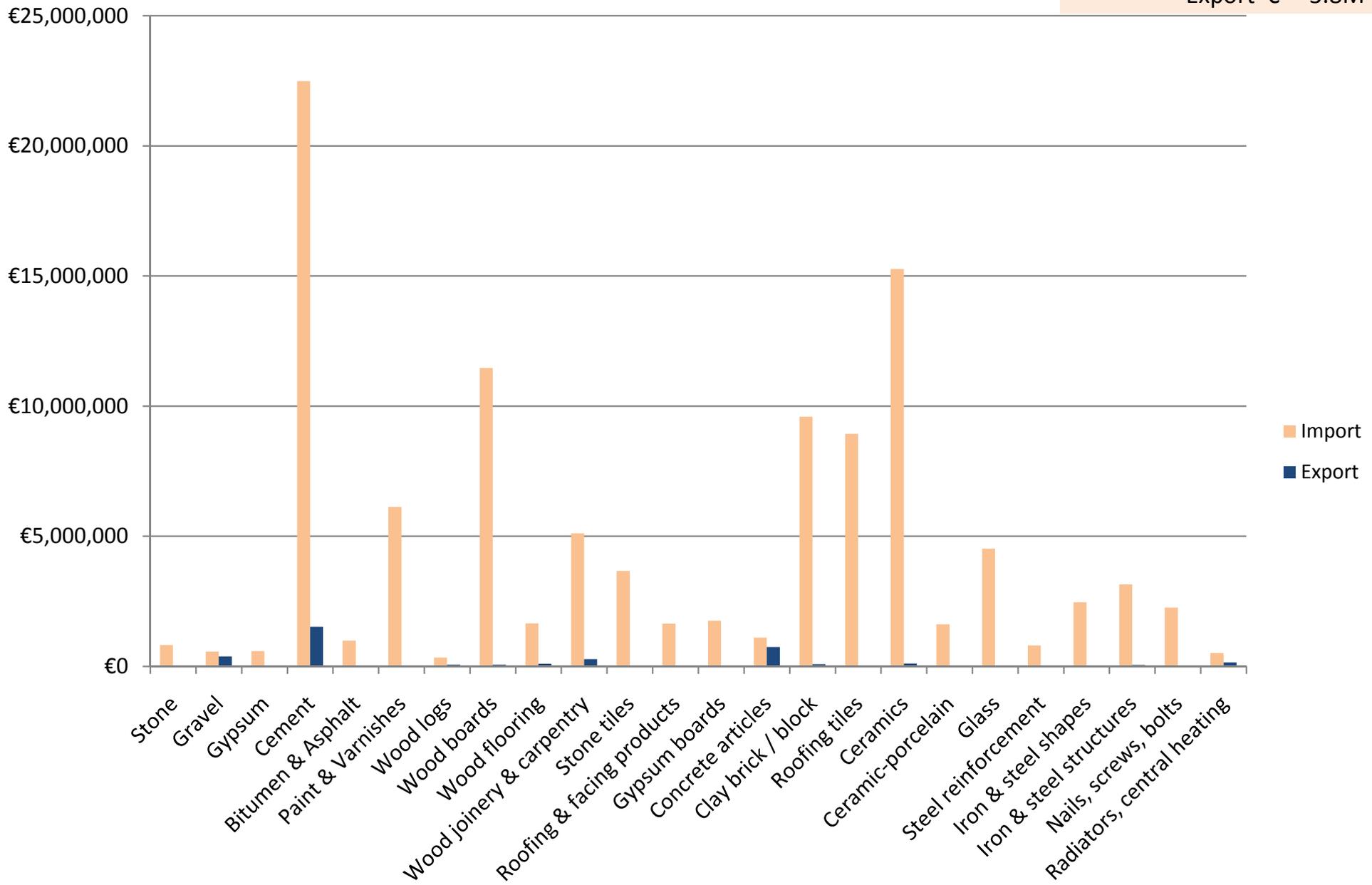
KPEP has recently prepared and submitted a study that clearly states the need for professional licensure of architects and presents alternatives and examples of implementation in other countries and jurisdictions. KPEP should work to support the efforts of the KAA and the appropriate government ministries to vigorously press for the implementation of occupational licensing regulations under the existing Construction Law which requires safe and appropriately designed buildings.

ANNEXES

- Annex I Kosovo Customs Import and Export Data for Selected Categories of Building Materials
- Annex II Basic Building Materials Selection Rankings
- Annex III Construction in Kosovo: Growing Opportunities for Kosovo Building Materials Manufacturers, Notes from the Stakeholders Workshop, 3 Aug, 2009.
- Annex IV Sample Cut Sheets for Building Materials and Products: brick, plaster, and paint.

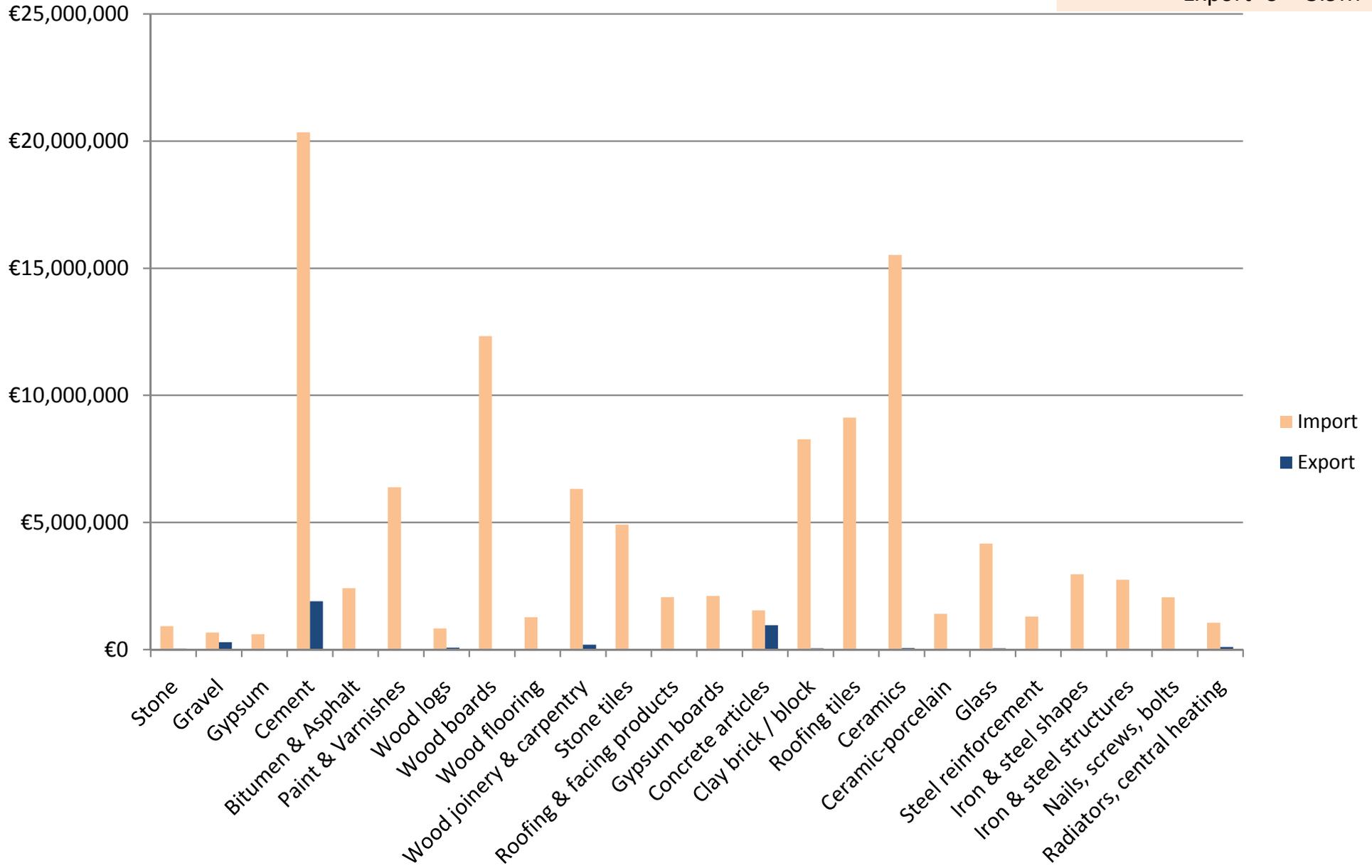
Construction materials in Kosovo in year 2007

Total: Import € 107.5M
Export € 3.8M



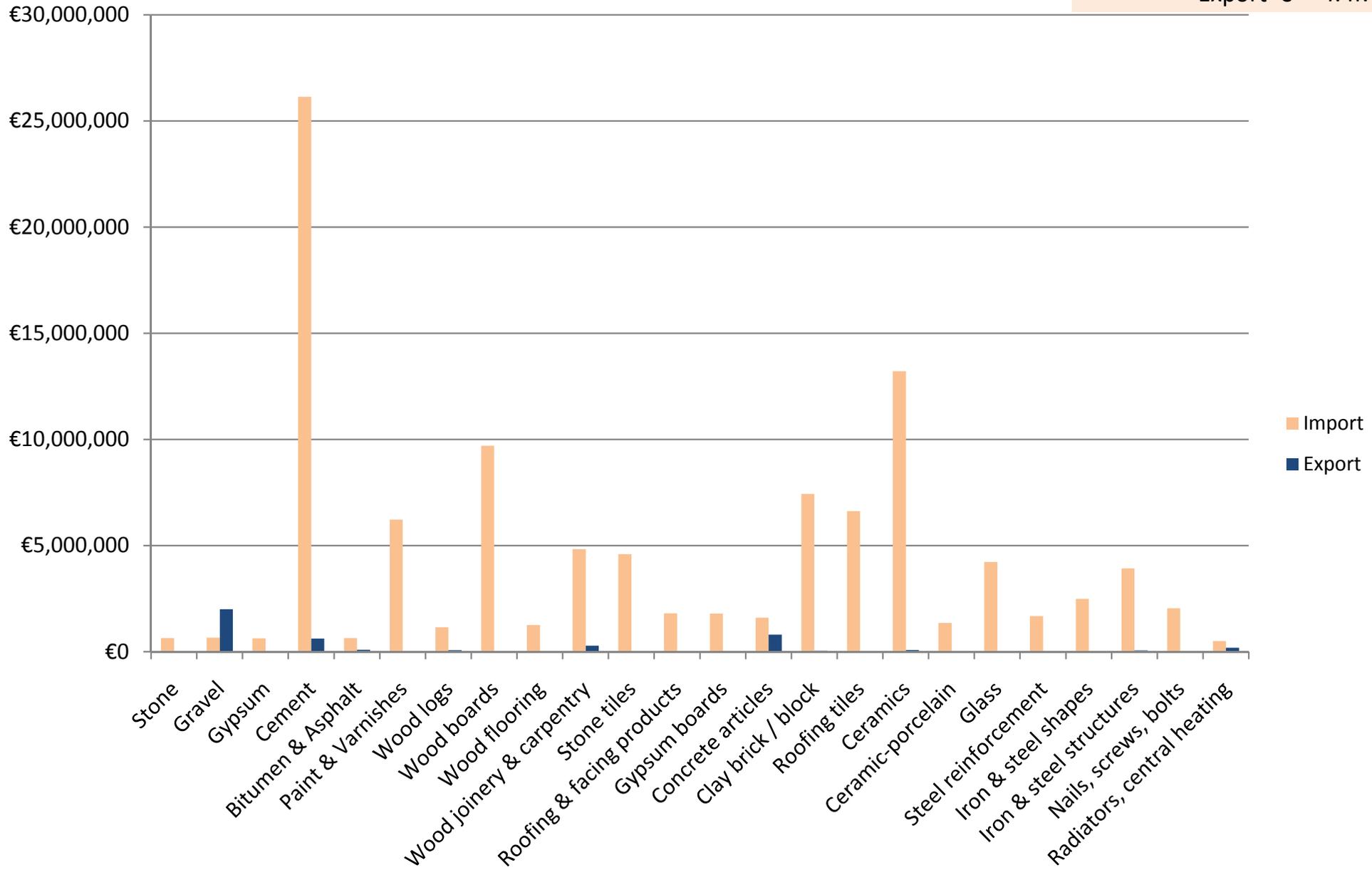
Construction materials in Kosovo in year 2008

Total: Import € 111.4M
Export € 3.9M



Construction materials in Kosovo in year 2009

Total: Import € 105.3M
Export € 4.4M



SECTOR SELECTION: KOSOVO BUILDING MATERIALS													
		Stone	Gravel aggregates	Gypsum	Cement	Bitumen & Asphalts	Paints & Varnishes	Wood Lumber	Wood Flooring	Wood Joinery & Carpentry	Stone tiles	Roofing and facing products	Gypsum Boards
Evaluation Metrics:	Weights (1 to 3 scale)	(Ranking 1 to 5 scale)											
Demand/ Market Potential	2	1	1	1	5	2	3	4	2	3	3	2	2
Outside Investment Potential	2	1	1	1	3	1	4	1	1	2	1	1	1
Return on Investment, Relative to Other Building Materials	1	2	2	2	3	2	3	3	2	3	1	2	2
Presence of Qualified Lead Firms with requisite management expertise	3	1	2	2	3	2	3	2	3	3	1	1	1
Sufficient Physical Infrastructure to Support Sub-Sector (without significant/prohibitive investment)	1	2	2	2	1	1	3	2	3	3	1	1	1
Availability and location of sufficient quantities of raw (or processed raw) materials	1	5	5	4	4	3	1	3	3	3	5	2	1
Low dependency on imported processed raw materials (inputs)	2	5	5	3	5	3	1	4	4	4	5	1	2
Low investment in resources required to introduce, rehabilitate, or improve manufacturing capability or capacity	2	2	3	1	1	1	3	2	3	3	1	1	1
Ability to establish successful model within project timeframe	3	1	3	1	3	2	4	2	4	4	1	1	1
Low level of foreign competition	1	3	3	1	1	1	2	2	2	2	1	1	1
Availability of skilled manufacturing & installation labor	1	3	3	1	4	2	3	3	3	3	2	2	2
Secondary Effects/ Multiplier Potential	2	3	3	2	4	2	2	3	3	3	2	2	2
Total		42	47	32	58	33	47	47	48	53	37	25	26

SECTOR SELECTION: KOSOVO													
BUILDING MATERIALS													
		Concrete items (pre-cast)	Clay brick and block	Clay Roofing tiles	Ceramics (tiles, etc)	Porcelain Ceramics (bath fixtures)	Glass	Steel Reinforcement	Iron & steel shapes	Structural steel	Nails, screws, bolts	Radiators, central heating	Sheet metals
Evaluation Metrics:	Weights (1 to 3 scale)	(Ranking 1 to 5 scale)											
Demand/ Market Potential	2	2	4	4	5	2	3	2	2	3	2	1	4
Outside Investment Potential	2	2	1	2	2	2	2	1	2	2	1	1	3
Return on Investment, Relative to Other Building Materials	1	2	1	2	2	2	2	2	2	2	1	2	3
Presence of Qualified Lead Firms with requisite management expertise	3	3	4	1	1	1	2	3	2	2	1	2	4
Sufficient Physical Infrastructure to Support Sub-Sector (without significant/prohibitive investment)	1	2	3	1	1	1	1	3	2	2	1	1	2
Availability and location of sufficient quantities of raw (or processed raw) materials	1	4	5	4	4	4	2	3	1	1	1	1	2
Low dependency on imported processed raw materials (inputs)	2	4	5	4	3	3	2	1	1	1	1	1	1
Low investment in resources required to introduce, rehabilitate, or improve manufacturing capability or capacity	2	4	4	2	2	1	1	3	2	1	1	1	3
Ability to establish successful model within project timeframe	3	4	4	4	2	2	1	1	1	1	1	1	4
Low level of foreign competition	1	2	2	1	1	1	1	2	1	1	1	2	2
Availability of skilled manufacturing & installation labor	1	4	5	5	2	2	1	3	1	1	2	2	3
Secondary Effects/ Multiplier Potential	2	3	2	5	3	3	2	3	2	2	2	2	2
Total		53	60	50	43	35	33	42	31	31	23	26	50

RANKING	SCORE
Clay brick and block	60
Cement	58
Concrete items (pre-cast)	53
Wood Joinery & Carpentry	53
Clay Roofing tiles	50
Sheet metals	50
Wood Flooring	48
Paints & Varnishes	47
Gravel aggregates	47
Wood Lumber	47
Ceramics (tiles, etc)	43
Stone	42
Steel Reinforcement	42
Stone tiles	37
Porcelain Ceramics (e.g. bath fixtures)	35
Glass	33
Bitumen & Asphalts	33
Gypsum	32
Iron & steel shapes	31
Structural steel	31
Gypsum Boards	26
Radiators, central heating	26
Roofing and facing products	25
Nails, screws, bolts	23

Kosovo Private Enterprise Program

Building Materials STTA

Findings from the Stakeholders Workshop

August 3, 2009

Stakeholders and participants in the building materials value chain were brought together in a one-day face-to-face workshop setting. In this facilitated discussion setting, building materials manufacturers, builders/developers, architects, engineers, investors and bankers were brought together to inform, validate and prioritize obstacles and opportunities for Kosovo building materials manufacturers.

The first goal for the workshop was to identify concerns and to categorize them in accordance to which participant group in the value chain were holding these concerns.

Materials manufacturers' concerns:

Many are relatively new participants in the market and in some cases not yet well known.

- There is strong international and regional competition (with high capacity, certified product quality, extensive expertise, marketing tools and lower prices).
- They lack the ability to get local quality testing and certification for their products to assure customers that their products/materials meet manufacturing standards.
- No control over the products of informal competition which have low prices and quality.
- Customs tax on some imported (processed) raw materials, products or equipment.
- VAT collection delay on unsold quantities of products (minimum 6 months and up).
- High electricity costs applied to manufacturers especially during the winter.
- Interest from end users (architects/engineers/designers, builders, university teachers and students) to visit production facilities and become familiar with the products available.

Architects/engineers/designers concerns:

- Quality assurance for materials/products to be specified on their projects. Locally produced materials currently cannot accommodate this as local certification does not reach 'CE' (European Conformity) levels and regional/international certification is an expensive investment.
- 'Customer care' (support service) with data on technical specifications and installation instructions, advice on selection of specific product for particular situation, on-site assistance during construction/installation process, warranty on products, etc.
- Flexibility in production of custom made products as well as broader palette of products.
- Competitive pricing.
- Gaining regular continuous knowledge of available materials
- Application of QA/QC systems for the construction industry.

Builders/contractors' concerns:

- Prices of many locally produced materials and products is higher than the imported competitor.
- Quality of most of the locally produced materials and products is much lower (and uncertified) than the imported competitor.

- Quality Certificate of the locally produced materials are not available for submission to the Construction Supervisor.
- 'Customer care' (service) with advice on selection of specific product for particular situation, on-site assistance during construction/installation process, warranty on products etc.

Banking:

- International banks with local presence currently are experiencing difficulties with supporting businesses due to their global strategy restrictions triggered by global financial crisis, especially in metal processing industry (due to unstable commodities prices) and real estate developments.

The next goal for the workshop was to compile and validate the following list of obstacles and barriers.

Obstacles and Barriers:

- There is better availability of more advanced materials through imports.
- Quality assurance for locally produced construction materials is weak.
- Most local manufacturers only have a very narrow palette of available products.
- There is a general lack of knowledge about locally made materials due to insufficient marketing efforts directed toward investors/developers, architects and builders.
- There is a general lack of sufficient technical information and installation instruction for products and materials.
- There is general lack of sufficient expertise in the manufacturers' workforce in production, marketing, research, testing and business management.
- There is a general lack of sufficient expertise in the architects/engineers/designers' workforce in construction materials, writing technical specifications for materials, and application of related QA/QC procedures.
- There is a general lack of sufficient expertise in the builders/contractors' workforce in construction materials, ability to read and follow the technical specifications, construction drawings and installation instructions.

The last objective of the stakeholder's workshop was for the participants to provide positive recommendations for improvement.

We asked the workshop participants the following question:

What can the stakeholders in the value chain do to increase the use of locally produced materials and products on Kosovo projects?

Business and professional associations:

- Arrange periodic B2B meetings to accommodate discussions between the industry chain stakeholders that will help to facilitate and encourage exchange of experience and requirements of the industry.
- Distribute qualitative marketing material for products to their association members and other groups/associations with an interest in these products.
- Promote and facilitate continuing education of professionals and their licensing in order to improve the quality of the services and reliability within the industry value chain.

Architects/engineers/designers:

- Express to the manufacturers their needs for technical specifications, installation instructions and quality certification as required for their product range; their needs for custom made products as well as 'customer care', service, and industry standard manufacturers warranties that they expect from manufacturers.
- Assist the manufacturers in preparation of the technical information and illustrated installation instructions for the manufacturers' products.

The Ministry of Trade and Industry:

- More aggressively promote and improve the standardization process, especially the value of the available 'KK' standard (Kosovo Conformity) in relation to European 'CE' (European Conformity).

Government:

- Improve fiscal and customs legislation to support business environment by:
- Reassessing the products that currently require excise tax
- Expediting collection of VAT for unsold products made from imported materials (since VAT must be paid by manufacturers at the border crossing for imported processed raw materials).

Brickwork Design Profile

Glen-Gery Extruded Brick

(Nominal Four-Inch)

General

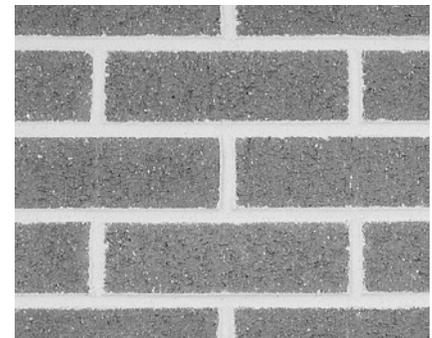
Glen-Gery manufactures many sizes of extruded bricks in a multitude of shades and textures to accommodate the visual requirements of most projects. The more popular extruded bricks have a nominal four inch bed depth. These extruded units are often referred to as cored, stiff mud, or wire-cut bricks. To differentiate between wire-cut bricks and wire-cut finishes, Glen-Gery refers to the wire-cut finish as a velour texture.

Unit Specifications

Glen-Gery extruded bricks are manufactured to conform to the requirements of American Society for Testing and Materials (ASTM) Standard Specification C 216, Grade SW, Type FBS and all grades of ASTM C 62. These products also conform to the requirements of ASTM C 216, Grade MW. Certain products meet the requirements of ASTM C 216, Type FBX, ASTM C 902, ASTM C 652, or ASTM C 32. Inquiries should be made for specific applications or conformance to standards other than ASTM C 216 or C 62. When specifying this product, the specifications should cite:

- 1) The product name and state "as manufactured by Glen-Gery Corporation."
- 2) Conformance to the requirements of the appropriate standard, (usually, ASTM C 216).
- 3) The actual unit dimensions listed as thickness x height x length.

Example: Glenrose Battlefield as manufactured by Glen-Gery Corporation to conform to the requirements of ASTM C 216, Grade SW, Type FBS. The units shall have dimensions of 3-5/8" X 2-1/4" X 7-5/8".



Design Criteria

Size:

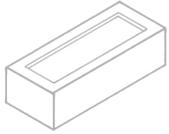
Glen-Gery extruded bricks are available in many sizes.

Description	Thickness x Height x Length		
	(in.)	(in.)	(in.)
Standard Standard	3 5/8	x 2 1/4	x 8
Modular	3 5/8	x 2 1/4	x 7 5/8
70 Standard	3 5/8	x 2 3/4	x 8
70 Standard Modular	3 5/8	x 2 3/4	x 7 5/8
King	3 5/8	x 2 3/4	x 9 5/8
Econo	3 5/8	x 3 5/8	x 7 5/8
Norman	3 5/8	x 2 1/4	x 11 5/8

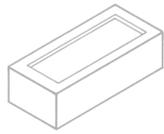
Other sizes may be available on special order.

Certain products are available in metric sizes on special order:

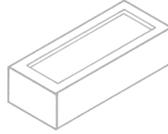
Thickness (mm)	x	Height (mm)	x	Length (mm)
90	x	57	x	190
90	x	65	x	190
90	x	90	x	190
90	x	57	x	290
90	x	90	x	290



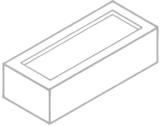
Standard
3⁵/₈" x 2¹/₄" x 8"



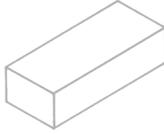
Standard
Modular
3⁵/₈" x 2¹/₄" x 7⁵/₈"



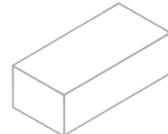
Oversize
3⁵/₈" x 2³/₄" x 8"



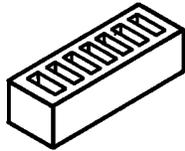
Oversize
Modular
3⁵/₈" x 2³/₄" x 7⁵/₈"



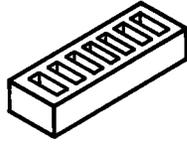
Standard
Modular
3⁵/₈" x 2¹/₄" x 7⁵/₈"



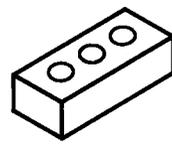
Handmade
Oversize
4" x 2³/₄" x 8¹/₂"



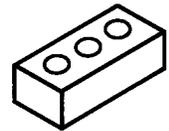
King
3⁵/₈" x 2³/₄" x 9⁵/₈"



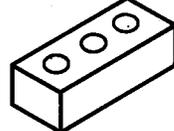
King
Narrow-Bed
3¹/₈" x 2³/₄" x 9⁵/₈"



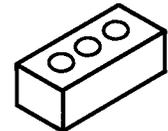
Standard
3⁵/₈" x 2¹/₄" x 8"



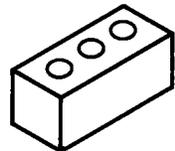
Standard
Modular
3⁵/₈" x 2¹/₄" x 7⁵/₈"



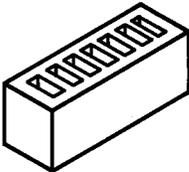
Series 70
3⁵/₈" x 2³/₄" x 8"



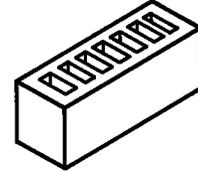
Series 70
Modular
3⁵/₈" x 2³/₄" x 7⁵/₈"



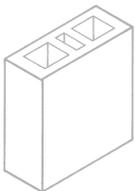
Econo
3⁵/₈" x 3⁵/₈" x 7⁵/₈"



Utility
3⁵/₈" x 3³/₄" x 11⁵/₈"



Norman
3⁵/₈" x 2¹/₄" x 11⁵/₈"



8-Square
3⁵/₈" x 7⁵/₈" x 7⁵/₈"

Actual coring patterns may not match the illustrations.

All shapes and sizes indicated are available from Glen-Gery. Brick units in black type are the subjects of this brochure.

Dimensional Tolerances:

Glen-Gery extruded bricks are manufactured to provide specific dimensional tolerances. The dimensional tolerances of the product are intended to be within the requirements of ASTM C 216, Type FBS. Generally, the product ordered will contain a number of units which are over or under the specified dimensions. The dimensional variations are related to the raw materials, forming, drying and firing processes, and the desired finish and color. Thus, for some products, all the units may be slightly over or slightly under the specified dimensions. Inquiries should be made regarding the dimensional variations which might be expected if project detailing requires precise coursing. Specialty products or gauged products may be desirable for such applications.

Configurations:

These units are manufactured to conform to the requirements of applicable ASTM standards. The solid units may have cores which create an aggregate void space of up to twenty-five percent of the gross cross-sectional area in every plane parallel to the bearing surface. Core size, size, shape and location are determined by the factory. The units may also be available as one hundred percent solid units. If one hundred percent solid units are desired, availability must be confirmed when ordering. In addition to one hundred percent solid units, variations in core size and configuration may be available on special order.

Weight:

The weight of the brick units varies with the raw material, size, manufacturing processes, and the amount and configuration of the coring.

Finishes:

Glen-Gery extruded bricks are available in a variety of textures. The textures include smooth, velour, bar, rug, matt, paper cut, scored, rockface, slurry and sand finishes. The availability of a particular finish is usually dependent on the particular product. Certain finishes (i.e. bark) are not available on shapes.

Color:

Glen-Gery extruded bricks are available in a multitude of color blends. The colors available include various shades of red, brown, gray, buff, and white. Some colors are the natural colors of the fired raw materials, while others are produced by fusing a surface treatment onto the surface of the brick during firing or adding minerals to the bodies of the bricks. If through body colors are desired, inquiries should be made regarding the availability of the desired colors. The color selection may also be limited by the product selected and the desired finish.

Shapes:

Standard brick shapes are shapes which are dimensioned to course properly with standard size brick. Standard brick shapes are not stock items. The standard size brick shapes are described in the Glen-Gery Standard Shapes Catalogue, "Brick Shapes." The typical extruded brick shapes, as described in the catalogue, include various configurations of bull-nose, watertable, octagon, shelf-angle, sill, and coping units. Shapes dimensioned for coursing with brick sizes other than standard size, and shapes having configurations to fit specific project requirements are also available. These nonstandard shapes require detailed dimension drawings

Description	Cored Units		100% Solid Units	
	Typical Weight (lb/unit)	Weight Range (lb/unit)	Typical Weight (lb/unit)	Weight Range (lb/unit)
Standard	4.4	3.8 - 5.0	5.0	5.0 - 5.2
Standard Modular	4.4	3.8 - 5.0	5.0	5.0 - 5.2
70 Series	5.0	4.5 - 5.2	5.0	5.0 - 5.2
70 Series Modular	5.0	4.5 - 5.2	5.0	5.0 - 5.2
King	6.5	5.5 - 7.2	5.0	5.0 - 5.2
Econo (3/9" joint)	6.2	6.2 - 6.4	5.0	5.0 - 5.2
Econo (1/2" joint)	6.2	6.2 - 6.4	5.0	5.0 - 5.2
Norman	6.4	5.5 - 7.3	5.0	5.0 - 5.2
Utility	9.2	9.2 - 9.4	5.0	5.0 - 5.2

which must be submitted to and approved by Glen-Gery. All shapes should be identified early in the project design because certain shape configurations may require special forming, drying, or firing processes. These processes may require more time or different scheduling than the non-shape brick.

Physical Properties of Units

Compressive Strength:

Average gross compressive strength exceeds 3,000 psi when tested with the loads applied normal to the bedding surface. Typically, the average compressive strength exceeds 7,000 psi and may be as high as 30,000 psi. The actual compressive strength depends upon the specific product selected.

Water Absorption:

The average maximum hot-water absorption by submersion in boiling water for five hours is less than 17% and will typically be less than 8%. The average saturation coefficient is generally less than 0.78. In instances where the saturation coefficient exceeds 0.78, the cold water absorption is less than 8% and the units meet the requirements of ASTM C 216, Grade SW.

Initial Rate of Absorption:

The initial rate of absorption (suction) normally does not exceed 30 grams per 30 square inches per minute under laboratory conditions. However, all brick should be checked on the site to determine if wetting is necessary prior to laying unless familiarity with the product has demonstrated that wetting is not required. The procedure for determining wetting requirements is the field test procedure described in ASTM C 67. If this test is not practical, the need for wetting may be estimated by the following field test:

- 1) Place a \$.25 piece on a bearing surface of a typical unit.
- 2) Draw a ring around the quarter with a wax pencil.
- 3) Place twenty drops of water within the ring.
- 4) If unabsorbed water remains after 1-1/2 minutes, the units likely do not require wetting. If all the water is absorbed into the unit, the units

should be wetted prior to laying.

Properties of Walls

Compressive Strength:

The minimum assumed compressive strength for a wall constructed of Glen-Gery extruded units, using good workmanship and Type N Portland cement-lime mortar, is 660 psi. Assemblies constructed with most Glen-Gery extruded bricks will provide a minimum assumed compressive strength of 1,200 psi, when used with good workmanship and Type N Portland cement-lime mortar. Specific products may provide assumed wall compressive strengths as high as 2,100 psi when used with good workmanship and Type N Portland cement-lime mortar. Reference: Brick Institute of America (BIA) Recommended Practice for Engineered Brick Masonry.

Thermal Performances:

The thermal resistivity of Glen-Gery extruded brick is approximately 0.11 (hr • sq. ft. • deg f)/(Btu • in.). A nominal four-inch wythe, excluding air films, will provide a thermal resistance of approximately 0.40 (hr • sq. ft. • deg f)/(Btu). The thermal resistivity is used to predict the thermal performance of wall elements under steady-state conditions. The mass and specific heat of this product provide additional benefit when subjected to the dynamic conditions of the natural environment. As described in the American Society of Heating Refrigerating and Air- Conditioning Engineers (ASHRAE) Standard 90, the effects of mass, specific heat, and the color of the brick should be considered. Reference: BIA Technical Notes on Brick Construction 4 Revised, "Heat Transmission Coefficients for Brick Masonry Walls," 4A Revised, "Heat Gain," 4B, "Thermal Transmission Corrections for Dynamic Conditions" and 43D, "Brick Passive Solar Heating Systems, Material Properties – Part IV."

Sound Transmission:

A nominal four-inch wythe of brick masonry has a sound transmission classification (STC) of approximately 45. Reference: BIA Technical Notes on Brick Construction 5A, "Sound Insulation – Clay Masonry Walls."

Fire Resistance:

A nominal four-inch wythe of load bearing brick masonry has an ultimate fire resistance period of 1-1/4 hours. This provides a one hour fire rating. Reference: BIA Technical Notes on Brick Construction 16 Revised, "Fire Resistance."

Coefficient of Thermal Expansion:

Brick walls constructed of Glen-Gery extruded brick have a coefficient of thermal expansion of approximately 0.000004 in. (in. • °F). A one hundred foot length (or height) of wall constructed of Glen-Gery extruded brick, and exposed to an annual extreme temperature difference of 100 °F, is expected to experience a total thermal movement of approximately one-half inch.

Coefficient of Moisture Expansion:

The coefficient of moisture expansion of Glen-Gery extruded brick is less than 0.0006 in./in. Although most of the moisture expansion of Glen-Gery extruded brick occurs immediately after the brick are fired, before the brick arrive at the job site, the maximum design moisture expansion of one hundred foot long (or high) wall constructed of these products is five-eighths inch.

Construction

Storage:

Store brick off ground to avoid contamination by water, mud, dust or materials likely to cause staining or other defects.

Protection:

Cover units with a weather resistant membrane held securely in place or otherwise protect units from the elements.

Wetting:

As deemed necessary, wet units prior to laying. Wetting typically consists of saturating the units three to twenty-four hours before laying the units. Units should be saturated but surface dry when laid.

Weather Extremes:

Follow the procedures developed by the International Masonry Industry All-Weather Council (IMIAC). Reference: IMIAC "Recommended Practices and Guide Specifications for Cold Weather Masonry Construction" and BIA Technical Notes on Brick Construction 1, "All Weather Construction."

Installation:

Place units in full mortar joints, taking special care to assure that the head joints are full. Use a Portland cement-lime mortar conforming to BIA MI or ASTM C 270. A prepackaged mortar mix conforming to these specifications is Glen-Gery Mortar Blend. Reference: "Brickwork Design Profile 4p1."

Tooling:

When thumbprint hard, tool all joints to produce a concave, grapevine, or vee joint finish.

Protection of Work:

At the end of each day or shut down-period, cover all work with a strong weather resistant membrane which is held in place securely. Care should also be taken to protect brickwork located near the ground from mud and dirt.

Cleaning:

At the end of each shift, remove excess mortar with a stiff bristle brush. Clean with wooden paddles and stiff fiber brushes using clean water. If a cleaning agent is necessary, presoak the wall with clean water prior to applying the cleaning agent and thoroughly rinse the wall with clean water after cleaning. Prior to cleaning with a cleaning agent, test the procedure and cleaning agent on a small sample area to observe the effectiveness of the cleaning agent and, most importantly, to detect any possible deleterious effects or changes in appearance of the brick. Check with your Glen-Gery Distributor or District Sales Manager prior to making a final selection of a cleaning agent. When using Type N mortars, clean down should never occur prior to 7 days after work is completed to assure appropriate curing of the mortar. Reference: BIA Technical Notes on Brick Construction 20 Revised, "Cleaning Brick Masonry."

Table 1
Brick and Mortar Quantities¹
Nominal 3/8 Inch Mortar Joints

Descriptive Unit Size	Vertical Coursing in courses per inches	Units Per Square Foot	Cubic Foot Per Square Foot		Quantities of Mortar Per 1000 Units	
			without Collar Joint	with Collar Joint	without Collar Joint	with Collar Joint
Standard	3 Courses per 8 ins.	6.45	0.058	0.121	9.00	18.79
Standard Modular	3 Courses per 8 ins.	6.75	0.059	0.122	8.77	18.03
70 Series	5 Courses per 16 ins.	5.37	0.054	0.117	10.07	21.70
70 Series Modular	5 Courses per 16 ins.	5.63	0.055	0.117	9.72	20.83
King	5 Courses per 16 ins.	4.50	0.052	0.115	11.60	25.49
Econo	1 Course per 4 ins.	4.50	0.041	0.104	9.15	23.03
Norman	3 Courses per 8 ins.	4.50	0.055	0.118	12.27	26.16
Utility	1 Course per 4 ins.	3.00	0.037	0.099	12.29	33.13

¹These values are actual quantities and must be increased for waste and any possible construction requirements which may necessitate additional quantities.

Table 2
Units Per Linear Foot In Various Positions
Nominal 3/8 Inch Mortar Joints

Descriptive Unit Size	Stretcher	Rowlock	Soldier	Header
Standard	1.43	4.50	4.50	3.00
Standard Modular	1.50	4.50	4.50	3.00
70 Series	1.43	3.75	3.75	3.00
70 Series Modular	1.50	3.75	3.75	3.00
King	1.20	3.75	3.75	3.00
Econo	1.50	3.00	3.00	3.00
Norman	1.00	4.50	4.50	3.00
Utility	1.00	3.00	3.00	3.00

Estimating:

The quantities of brick and mortar required for a project vary with the size of the brick unit, the wall construction, the number of field cuts necessary, the coring configuration of the units, and the workmanship. Table 1 provides the quantities of brick and mortar quantities per 1,000 brick units. The figures are based on the units being placed in the wall as stretchers in stack or running bond. The quantities are provided for a single wythe of brickwork with

and without a nominal three-quarter inch collar joint. The values provided are estimates of the quantities in the finished wall and do not account for waste. The values provided in Table 2 may be useful in approximating the number of units for caps, sills, bands, etc. These values represent the actual number of units per linear foot for the various brick sizes placed on the four most frequently used positions in the wall. The values are based on a nominal three-eighth inch mortar joint.



Sales/Service Centers

Illinois

Chicago Sales Office
273 W. 83rd. St.
Suite B-1
Burr Ridge, IL 60521
TEL (630) 655-1121
FAX (630) 655-0163

Michigan

Midwest Regional Sales Office
37720 Hills Tech Drive
Farmington Hills, MI 48331
TEL (248) 489-9338
FAX (248) 489-8028

New Jersey

Northeast Regional Sales Office
75 Hamilton Road
Somerville, NJ 08876
TEL (908) 359-7305
FAX (908) 359-5116

Ohio

Ohio Sales Office
County Road #9
P O Box 208
Iberia, OH 43325
TEL (419) 468-4890
FAX (419) 468-6037

Pennsylvania

Lehigh Valley Sales Office
1960 Weaversville Road
Allentown, PA 18103
TEL (610) 264-5565
FAX (610) 264-2860

Brick Centers

Iowa

Glen-Gery Brick Center
101 Ashworth Road
W. Des Moines, IA 50265
TEL (515) 224-4110
FAX (515) 224-4057

Kansas

Kansas City Brick Showroom
9343 W. 74th. Street
Merriam, KS 66204
TEL (913) 677-4680
FAX N/A

Missouri

Glen-Gery Brick Center
2400 Allen Terrace
Kansas City, MO 64108
TEL (816) 474-4680
FAX (816) 474-1549

Pennsylvania

Glen-Gery Brick Center
299 Brickyard Road
P O Box 337
New Oxford, PA 17350
TEL (717) 624-2144
FAX (717) 624-2720

Glen-Gery Brick Center

744 S. 23rd. Street
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FAX (717) 561-0284

Glen-Gery Brick Center

1166 Spring Street
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FAX (610) 378-0918

Glen-Gery Brick Center

RR # 2 Susquehanna Trail
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FAX (717) 742-7112

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P O Box 2903
York, PA 17403
TEL (717) 854-8802
FAX (717) 854-1251

Virginia

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9905 Godwin Drive
Manassas, VA 22110
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FAX (703) 368-1280

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Glen-Gery Corporation
1166 Spring Street
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Seller warrants title to said goods and that the goods supplied shall meet applicable specifications where such are designated in the Buyer's order. Should the said goods fail to conform to the foregoing warranty, Seller will, at its option replace the same, F.O.B. job site or refund the portion of purchase price paid for such non-conforming goods. SELLER SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR ANY BREACH OF THESE WARRANTIES. THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, INCLUDING, WITHOUT LIMITATION, WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR



Diamond Wall Concentrate

A Cementitious, Fiber-reinforced, Stucco Base



Coverage

Approximately 8yd² to 10yd² (6.7m² to 8.4m²) per bag at 3/8" thick. Coverage may vary due to ambient temperature, surface temperature, surface porosity, mixing and/or application methods.

Packaging

Moisture resistant, 80lb (36.29kg) bags

Storage

1. Store bags in a cool, dry location.
2. Store away from direct contact with the ground and/or concrete.
3. Store out of direct sunlight.
4. Protect bags from weather and other damage.

Shelf Life

1 year

Color

Natural grey color

Product Description

Diamond Wall Concentrate (DWC) is the base coat for the Diamond Wall Stucco Systems. DWC is a factory prepared blend of portland cement complying with ASTM C150, chopped fibers, and proprietary ingredients field mixed with sand, water, and an optional admix.

Features

Durable

Fiber-reinforced

Single application with some finish coats able to be applied within 24-hours

1-hour Fire-resistant-rated

Benefits

Superior weathering properties

Reduced cracking when cured properly

Reduced labor and scaffolding costs; schedule savings

Single-family, multi-family, and commercial applications

Basic Uses

Diamond Wall is designed for use as a base coat in residential and commercial wall assemblies. DWC provides an ideal base coat for the application of OmegaFlex or AkroFlex Acrylic Finishes and ColorTek Stucco. Diamond Wall Concentrate exceeds ASTM C926 and may be used in three coat stucco applications. For one coat stucco systems refer to ICC-ES ESR-1194 report.

Area of Use

Diamond Wall Concentrate may be applied over the following substrates:

1. Wood or OSB
2. Exterior grade gypsum sheathing/glass mat reinforced gypsum sheathing
3. Fiber board
4. EPS, XEPS, or polyisocyanurate foam boards
5. Masonry
6. Poured-in-place and/or tilt-up concrete
7. Other approved cementitious boards
8. Lath (three coat application only)

Surface Preparation

Solid Substrates

For solid substrates, such as concrete or masonry, surfaces to receive application must be structurally sound, clean and free of debris, dirt, dust, efflorescence, grease, oils, curing agents, and cleaning solutions. Repair cracks with the appropriate patching material for the existing substrate as needed. Bonders or admixtures may be required to insure proper adhesion.

Framing

Insure substrates, water-resistive barrier, and lathing has been installed and inspected as required by ICC-ES ESR-1194 report, Omega Product's literature, and/or local building codes as applicable.

Mixing

1. Add approximately 4 to 6 gallons (15.1L to 22.7L), per bag, of potable water to mixing apparatus.
2. Start mixer and add Diamond Wall Concentrate. Add optional admix per admix data sheet.
3. Add 160lb to 240lb (72.6kg to 108.9kg) of plaster sand, meeting ASTM C144 and/or ASTM C897. Amount of sand added may vary due to moisture content and/or composition of plaster sand.
4. Mix for approximately 3 to 5 minutes.
5. Stop mixer and allow the material to take its initial set.
6. Retemper the material adding only enough water to reach the desired consistency.

NOTE: Do not over mix.

Application

Diamond Wall can be hand troweled or machine sprayed.

1. Apply the mixed Diamond Wall per ICC-ES ESR-1194 for one coat application or ASTM C926 for three coat application.
2. Rod or screed to achieve a uniform surface.
3. Float the freshly applied Diamond Wall to ensure even suction.

Curing

Provide sufficient moisture by fog or moist curing to permit proper hydration of the Diamond Wall. The length of time and most effective procedure for curing will depend on climatic and job conditions. Product should fully cure in 7 to 28 days following application. Curing time may vary due to ambient temperature, surface temperature, surface porosity, application methods, and/or thickness of material. All freshly applied material must be protected by an approved protective system from inclement weather until cured. It is the responsibility of the applicator to determine if the product is cured and/or dry prior to exposing it to rain, snow, dew, and/or any other inclement weather condition that may be detrimental to the product.

Limitations

DO NOT apply product when the ambient and surface temperature is below 40°F (4°C). When hot, dry, or windy conditions exist, moist curing and protection must be provided. The ambient and surface temperature must maintain the above requirements until fully cured (See CURING). Material that is allowed to freeze may suffer irreparable damage. Protect all work from inclement weather with an approved protective system until fully cured.

DO NOT add any other materials to the mixture of the product without written approval from Omega Products International, Inc.

DO NOT deviate in the mixing or application procedures contained in this, or any other Product Data Sheets, without written approval from Omega Products International, Inc.

DO NOT apply Diamond Wall if there are contaminants on the receiving surface. Contaminates may include, but are not limited to, dust, debris, efflorescence, and/or oils.

DO NOT add any more water than prescribed.

DO NOT saturate the wall during preparation and/or water curing.

DO NOT use excessive amounts of water when floating.

NOTE: Failure to follow manufacturer's written specifications could result in the following, but not limited to spalling, cracking, peeling, chipping, delamination, discoloration, wash off, and overall system failure.

Cleaning

Cleaning may be accomplished with water immediately after use.

Safety

Avoid contact with eyes or prolonged contact with skin. Wash thoroughly after handling. In case of eye contact, flush immediately with running water for at least 15 minutes. Consult a physician immediately. Do not take internally. Be sure to provide adequate ventilation in enclosed areas. Use of an approved respirator is recommended.

KEEP OUT OF REACH OF CHILDREN

www.omega-products.com

Disclaimer

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the control of Manufacturer; therefore, no warranty is made, expressed or implied, as to the results obtained from the use of the product or against any claims for infringement of patents resulting from use of the product. Under no circumstance shall Manufacturer be liable for incidental or consequential damages arising out of the use or the improper application of the product. Before applying the product, the user shall determine the suitability of the product for his/her independent use, assuming all risks and liability whatsoever in connection therewith. This writing constitutes a complete and exclusive statement of the understanding between Manufacturer and Buyer.

Claims

Any Claimant shall notify Manufacturer immediately in writing of any alleged defect in the material. Claimant will provide Manufacturer with a reasonable and exclusive opportunity to investigate and test for the alleged defect. For any claim that is not valid Claimant agrees to pay Omega's reasonable charges, including travel and labor associated with investigation of such claim.

Technical Assistance

Technical assistance and information is available by calling Omega Products International, Inc. at (800) 600-6634 or FAX (951) 520-2594 or by e-mail at info@omega-products.com.

Warranty

The following is made in lieu of all expressed and implied rights, warranties and conditions, statutory or otherwise. The manufacturer's only obligation shall be to replace such quantity of products proven to be defective within one year following the date of manufacture, provided that the alleged defective product is returned prepaid to the manufacturer's plant and is accompanied with proof of purchase and batch number.



MIRROLAC® WB

High Performance Acrylic
Interior/Exterior Waterborne
Semi-Gloss Enamel
DP83XX

DESCRIPTION

An advanced technology, premium quality, waterborne acrylic semi-gloss enamel for interior or exterior use on properly prepared wood, metal, or masonry surfaces. Bonds to clean glossy, hard surfaces such as aged oil base or alkyd enamels without sanding. This all purpose, non-yellowing finish is ideal for use on walls, equipment, machinery, piping, structural steel, storage tanks, wood or metal trim, shutters, building exteriors, prefinished siding and metal fences. Ideal for use on windows, doors and

shelving without worry of sticking. Features alkyd-like hardness and durability, exceptional adhesion, superior flow and leveling, fast dry, easy application, excellent gloss and color retention, low odor, high hiding and excellent resistance to washing, grease, oil and water. Low VOC. Application characteristics include "Dry Fall" under most conditions. (See Application)

FEATURES

- Alkyd-like hardness and durability
- Excellent gloss and color retention
- Low odor and water clean-up
- Good flow and leveling
- High hiding
- Non-yellowing
- Washable
- Rapid dry — minimum downtime in plant operations
- Abrasion resistant
- Bonds to clean glossy surfaces without sanding
- Easy application — brush, roll or spray
- All purpose finish for multiple surfaces
- Highly flexible — resists peeling and chipping
- Resistance to grease, oil and water
- Low VOC

COMPOSITION

- Advanced Technology Acrylic Resin
- Pigmentation varies with color
- Not formulated with lead or mercury containing materials

SPECIFICATION DATA

Color: White, ready-mix and custom colors
Finish: Semi-Gloss (50 units @ 60°)
Clean-up Solvent: Soap and water
Density: 10.4 lbs./gal. (1.25 kg/L) — varies with color
Recommended Film Thickness: 1.5-2.0 mils dry — 3.5-5.0 mils wet
Service Temperature Limits: 200°F (93°C) in air
VOC: 1.59 lbs./gal. (190 g/L) — varies with color
Solids: Volume — 42% + 2% — varies with color

Practical Coverage: Apply at 336-448 sq. ft. per gallon (8-11 m²/L) or 3.5-5.0 mils wet (1.5-2.0 mils dry) depending on surface texture and porosity.
Flash Point: None
Dry Time @ 77°F (25°C) & 50% RH:
 To touch — 1 hour
 To recoat — 2 hours
Shelf Life: Over 1 year

PERFORMANCE DATA

PROPERTY	TEST METHOD	RESULTS
Adhesion	ASTM D3359, Method A	Excellent: 5A, No peeling or removal
Hardness	ASTM D3363, Pencil	Very Good: B
Flexibility	ASTM D1737, 180° bend, 1/8" mandrel	Excellent: No cracking or flaking
Direct Impact Resistance	ASTM D4585, Gardner Impact Tester	Very Good: > 100 in-lbs
Abrasion Resistance	ASTM D4060, Tabor CS17, 1000g load	Good: 260mg loss/1000 cycles
Stain Resistance (Coffee, Grape Juice, Mustard, Lipstick, Food Coloring)	ASTM D1308, washed with soap and water after 24 hours contact	Excellent: No effect
Block Resistance	ASTM D2793, 2 kg/in2 @ 120°F	Excellent: No sticking

S U R F A C E P R E P A R A T I O N

All surfaces must be sound, dry, clean and free of oil, grease, wax, polish, mildew, form release agents, curing compounds and foreign matter. Remove all loose paint, rust and scale by scraping and wire brushing. Scuff sanding is required only on glossy, hard, slick or dense surfaces in exterior areas or other areas which are subject to high levels of moisture.

NEW SURFACES: STEEL - Prime with waterborne metal primer DP 85XX or solvent-borne metal primer DP 13101 and allow to dry overnight. **Galvanized Metal and Aluminum** - Prime with waterborne metal primer DP 85XX and allow to dry overnight. **Wood** - Interior, set nails and fill holes with latex spackle. Sand smooth. Dust clean. Self-prime or prime with latex primer DR 51701. Do not use this product with lacquer undercoats. Exterior, spot prime pine knots with latex primer DR 1502. Prime entire surface with latex primer DR 1502. **Drywall** - Interior, prime with latex primer DR 50801 or DR 51701. **Concrete, Plaster and Masonry** - Cure at least 30 days before painting. pH must be 10.0 or lower. Roughen slick poured or precast concrete and remove sealers by chemical cleaning or abrasive method such as sandsweeping. Rinse thoroughly with water and allow to dry. Remove loose aggregate. Prime interior concrete or plaster with this product or with latex primer DR 51701. Prime exterior concrete with latex primer DR 1502. Fill concrete block with latex block filler DV 52903.

NOTE: In areas of frequent hand contact and cleaning, such as cabinets or interior doors, a clear coat of a waterborne gloss or satin compatible varnish or sealer is recommended depending on the final sheen level desired.

PREVIOUSLY PAINTED SURFACES: Wash to remove contaminants. Rinse thoroughly with water and allow to dry. Sanding is not required if the surface is properly and thoroughly cleaned (scuff sanding is required only on glossy, hard, slick or dense surfaces in exterior areas or other areas which are subject to high levels of moisture). Remove loose paint. Scrub heavy chalk exterior areas and overhead areas such as eaves with soap and water. All existing mildew must be removed by washing with a solution of 16 oz. (473 mL) liquid household bleach and two oz. (59 mL) non-ammoniated liquid detergent per gallon (3.785 L) of water. Rinse surfaces clean with water and allow to dry for 24 hours. Prime bare areas with primer specified under **NEW SURFACES**. Prime porous flat interior surfaces with latex primer DR 51701 or for exterior surfaces prime with latex primer DR 1502. Can be used self-primed over previously painted surfaces followed by a finish coat of this product.

WARNING! If you scrape, sand, or remove old paint, you may release lead dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear an NIOSH-approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead.

D I R E C T I O N S

TINTING: Tint the appropriate base with ICI Paints Colorants.

SPREADING RATE: Apply at 336-448 sq. ft./gal. (8-11 m²/L) or 3.6-4.8 mils wet (1.5 - 2.0 mils dry). Actual coverage may vary depending on substrate and application method. For best hiding, tint primers toward finish coat color. Certain colors such as yellow, orange and pink may require multiple coats.

APPLICATION: Mix thoroughly before use. May be applied by brush, roll or spray. No thinning required. Due to fast dry, brushing should be limited to small areas where a wet edge can be maintained. Rinse out brush in warm water periodically during extended brush application periods. For improved brushing, add up to eight oz/gal of Devoe Mirrolac-WB Retarding Additive DP 8345 (do not exceed this level). If touch-up is required after the enamel has set, wait until it has thoroughly dried. For airless spray, use a .013" tip. Adjust pressure as needed. Use two coats of this enamel for maximum durability and uniformity. Do not apply when surface or air temperature is below 50°F (10°C) or if rain or heavy dew is expected within 12 hours of application. Dry overspray can be wiped or washed from most surfaces.

Satisfactory dry-fall performance depends upon the height of work, weather conditions and equipment adjustment. Low temperature and high humidity are of particular concern. Test for each application as follows: Spray from 15 to 25 feet towards paint container. The material then should readily wipe off. Note: Heat can fuse dry overspray to surfaces. Always clean dry overspray from hot surfaces before fusing occurs. Be aware that exterior surface temperature can be higher than air temperature.

DRYING TIME: At 77°F (25°C) and 50% R.H., dries to touch in one hour and to recoat in two hours. Low temperature, high humidity, thick films or poor ventilation will increase these times.

CLEAN-UP: Clean immediately with warm, soapy water.

WASHING INSTRUCTIONS: Do not wash in less than seven days after application. Use a non-abrasive, mild detergent and water and a cellulose sponge. Do not attempt to clean the dried film with cleaners that contain ammonia and/or solvent such as window, tile or appliance cleaners.

P R E C A U T I O N S

CAUTION! SEE LABEL OR MSDS FOR USE OF HAZARDOUS INGREDIENTS. KEEP OUT OF REACH OF CHILDREN.

May cause eye, skin, nose and throat irritation.

Use only with adequate ventilation. Do not breathe vapors, spray mists or sanding dusts. If indoors, open windows and doors to ensure continuous flow of fresh air during mixing, application, drying and sanding. When spray applying or if you experience eye watering, headaches or dizziness, increase fresh air or wear respiratory protection (NIOSH/MSHA TC23C or equivalent), or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided, wear an approved particulate respirator (TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Do not get in eyes, on skin or on clothing. Use safety eyewear with splash guards. Do not take internally.

FIRST AID: If you experience difficulty in breathing, leave the area to obtain fresh air. In case of eye contact, flush with large amounts of water for at least 15 minutes. **Get medical assistance.** In case of skin contact, wash area thoroughly with soap and water. Remove soiled clothing. **Get medical assistance** if irritation persists. Wash clothing before reuse. If swallowed DO NOT INDUCE VOMITING. **Get medical assistance immediately.**

Keep container closed when not in use. Do not store above 110°F. Keep from freezing. Do not transfer contents to bottles or other unlabeled containers. In case of spillage, absorb with inert material. Dispose of contaminated absorbent, container and unused contents in accordance with local, state and federal regulations. Do not incinerate closed containers. In case of fire use CO₂, Dry Chemical, Foam or other approved method for treating a Class B fire. Do not use water. Summon professional fire-fighters.

See Material Safety Data Sheet for complete Safety and Precautionary requirements.



ADSTOCK #78707

83XX

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When It's Worth Doing Right!®



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